New Zealand Journal of Agriculture

VOL. 69, No. 1. WELLINGTON, JULY 15, 1944

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THE NEW ZEALAND

JOURNAL OF AGRICULTURE

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Published by direction of Hon. B. Roberts, Minister of Agriculture.

Serpentine Superphosphate

The case for and against serpentine superphosphate, a reasoned explanation of the attitude adopted by the National Council of Primary Production, and the motives actuating the council's recommendations to the Government are here forcibly outlined by Mr. L. J. Wild, M.A., B.Sc., author of "Soils and Manures in New Zealand" and one-time agricultural chemist at Lincoln Agricultural College. Mr. Wild is a member of the National Council of Primary Production and Principal of the Feilding Agricultural High School. During a recent tour of the North Island he addressed meetings of farmers and heard their views. With his wide experience, his services on the council, and recent personal contact with farmers affected by the fertiliser position, he may fairly be regarded as having viewed closely all aspects of his subject.

IN THE first year of the war New Zealand farmers were using the products derived from the processing of 373,000 tons of imported phosphate rock. The Primary Production Council realised perfectly well that there was danger in the situation, owing to the possibility of raiders in the Pacific, and recommended that stocks of phosphate be built up, but this was impossible because of the lack of shipping. In due course, the expected happened and German raiders damaged the plant at Nauru and sank some of the ships specially built for the phosphate trade; then when the Japanese came into the war they occupied Nauru Island and they are still there. We were then faced with a reduction by more than half in the available supplies of phosphate rock in New Zealand. The Primary Production Council realised well that production depended on the continuous supply of phosphates as much as on anything else, and set itself to deal with the problem. It looked at it from three points of view.

First, were there any other handy sources of phosphate that might be exploited? Some phosphate material in Fiji was looked at but found to be not very suitable for the purpose; steps were taken to work over again the deposits at Clarendon, in Otago, which had been abandoned for economic reasons 20 years ago. The amount of phosphate so obtained is a useful but very small contribution.

Secondly, the Primary Production Council introduced rationing, which, of course, was unavoidable, and with the general principle of which no one can possibly find fault, although naturally there was and still is a diversity of opinion as to the best method of working out a rationing scheme.

In the third place, and this is most important, the council determined to see that every ton of phosphate rock imported into the country should be applied in such a way as to do the maximum amount of good in the way of production.

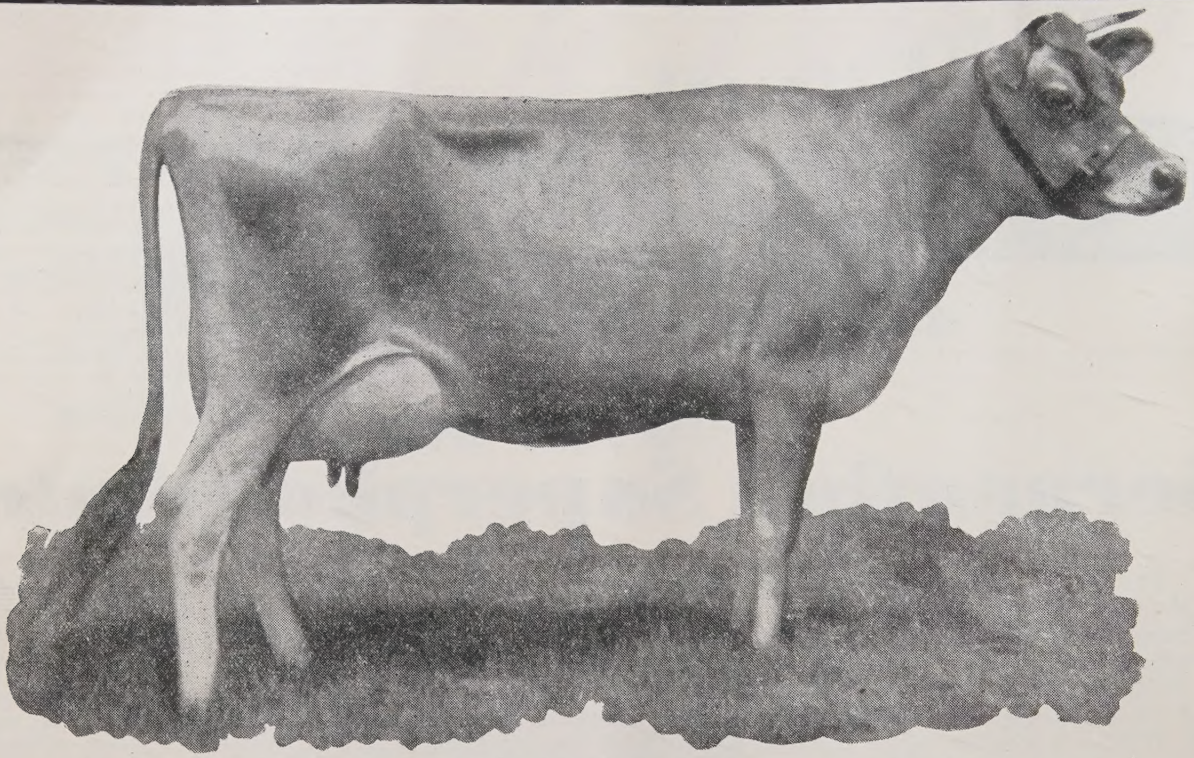
Now, considering this question, it has long been evident that the use of phosphate in the form of superphosphate, while very effective, is a very wasteful method of use by reason of the fact that only a relatively small proportion of the phosphate so applied is recovered by plants, the rest going into a relatively insoluble state in the soil and becoming permanently unavailable. This perhaps does not matter while there is apparently no limit to the raw material available, though even then wise statesmanship would indicate the necessity for looking ahead and conserving phosphates. **But under the conditions of a severe restriction in supplies of rock phosphate it was, and is, essential to get the utmost production from available supplies.**

About the time when the Primary Production Council had to consider this problem, or rather before that time, information was becoming available, derived originally from Russian workers in soil science, that by treatment of superphosphate in the hot moist condition with certain materials, the main constituent of which is magnesium silicate, the phosphate is converted into a new form which is more stable in the soil and which yields a relatively greater percentage of the total phosphate to plant growth.

Local Experiments

It was known that in New Zealand a suitable material of this kind was available in the serpentine rock found in North Auckland, in Southland, at D'Urville Island, and in some other places. Steps were taken 4 or 5 years ago to produce an experimental lot of this material, which is now generally known as serpentine superphosphate. It is most important to understand that serpentine superphosphate is not a mere mixture of fine ground serpentine with superphosphate, and the term "dilution" applied in this connection is completely misleading. A chemical change takes place when the treatment is carried out under proper conditions and a new type of phosphate is produced.

Preliminary experiments made in various parts of New Zealand gave



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most promising results, and, broadly speaking, it is maintained that 1 cwt. of serpentine superphosphate yields to plants growing in the soil as much phosphate as 1 cwt. of superphosphate. In other words, here was a method of increasing our available supplies of phosphate for use in primary production, and the Primary Production Council decided to recommend the Government to adopt the method and to have all available rock phosphate converted into serpentine superphosphate.

The preliminary experiments, the results of which have since been abundantly confirmed, indicate that in general throughout New Zealand 1 cwt. of serpentine superphosphate is as good as 1 cwt. of superphosphate. If the results from the application of equal quantities of the two materials are equal, then it is quite obvious that serpentine superphosphate is better than superphosphate because it contains only three-quarters superphosphate, while the rest is a native New Zealand material, so that in effect we have by the use of serpentine superphosphate increased the available supplies of phosphate by one-third.

Council's Responsibility

A certain measure of dissatisfaction has been engendered in some parts of the country, and fostered, not so much by an interest in production as by the advertisement of another form of phosphate, and this has been used for the purpose of belabouring the Government. So, as a member of the National Council of Primary Production, I wish to make it clear that the responsibility for the recommendation and for again and again urging the Government to take steps that it finally did take rests on the National Council of Primary Production. Who, then, are on the National Council of Primary Production? There are 10 members, all, with one exception, men with long experience of farming in New Zealand, and all, with one exception, men who have been elected by their fellow-farmers to one or other position of leadership in the industry. It is, therefore, safe to say that any other farmer who found himself a member of the National Council and who had to consider the evidence in the matter that the National Council had before it would have come to exactly the same conclusion, namely, that the conversion of all phosphate available in the North Island to serpentine superphosphate should be made compulsory.

There were, of course, other reasons for the introduction of serpentine superphosphate. Superphosphate is notoriously objectionable to store, in that it tends to set hard and to rot the bags, and about the time when we were considering the matter we were experiencing the greatest difficulty, owing to shipping shortage, in getting a sufficient supply of fertiliser bags; and this apart from the cost resulting from the rotting of bags. **Another point was that serpentine superphosphate is very free running and stores indefinitely without setting. It is also reputed to contain certain trace elements, such as cobalt, in appreciable quantity and as well supplies magnesium to the soil, which is quite an important consideration in itself according to the most recent statement on the subject by the Cawthron Institute, which reads as follows:—**

> "The continued use of superphosphate cannot but fail to have an important effect on the status of potash and magnesia in the soil, unless applications of fertilisers containing these plant foods are made from time to time. Officers of the Soil Survey Division have examined the exchangeable potash and magnesia contents in Waikato soils both with and without phosphate treatment. They found that definite losses in both potassium and magnesium were associated with the long-continued use of superphosphate as a top-dressing. Their data indicated that while a considerable proportion of the potash losses could be accounted for in products sold off the farm, this was not the case with magnesium. There can be little doubt that the large amount of gypsum contained in superphosphate has forced magnesium into soil solution, resulting in considerable loss by the leaching action of rain. In both cases the losses of potash and magnesia over a period of years are comparatively large, and undoubtedly the time must come when attention must be paid to the use of these plant foods in fertiliser programmes."

English Trials

Coming to quite recent times, a report just come to hand from the Rothamsted Experiment Station in England states that in some experiments recently conducted at this world-famous station New Zealand serpentine superphosphate gave results closely similar to those obtained from a mixture of one part basic slag and three parts superphosphate. This is, of course, a most interesting and suggestive statement, for the usefulness of a mixture of superphosphate and basic slag has long been appreciated in New Zealand.

Recently a conference of technical officers of the Departments of Agriculture and Scientific Research was held to consider all aspects of the manufacture and use of serpentine superphosphate. The results of several years' experiments on farm crops and grassland and farmers' use of serpentine superphosphate were reviewed.

After a full discussion the conference concluded:—

1. **That in general serpentine superphosphate is at least equal to superphosphate as a fertiliser for annual crops and topdressing grassland. Over the past 4 years some hundreds of official experiments have been conducted on crops and pastures, and in most of these equivalent quantities of serpentine superphosphate and superphosphate have been compared. In a number of instances serpentine superphosphate has shown a definite superiority. In others this is not the case, but there is evidence of a progressive effect from serpentine superphosphate. On all evidence available the conference viewed that weight for weight**

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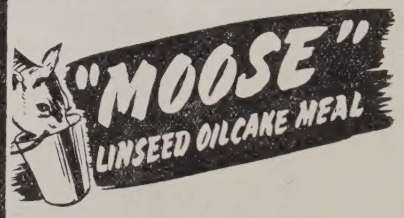

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and over New Zealand as a whole serpentine superphosphate is at least not inferior in productive value to superphosphate.

2. **That on lime-responsive soils lime is just as necessary with use of serpentine superphosphate as with superphosphate. Whilst, unlike superphosphate, which is acid, serpentine superphoshate is a neutral fertiliser, the conference stressed the point that on lime-responsive soils it is still desirable to carry on a normal liming programme. In some quarters there had been an impression that the use of serpentine superphosphate is incompatible with the use of lime. This is quite erroneous. Farmers can lime normally and there is no technical reason for not using lime along with serpentine superphosphate.**

3. **That there will always be an important place for serpentine superphosphate in New Zealand fertiliser practice. From a study of the characteristics of Dominion soil types and because of the chemical and physical properties of serpentine superphosphate (explained in the Journal of Agriculture for January, 1943) the conference considered that even in the post-war period, when it is hoped that New Zealand will have adequate supplies of phosphate, there will be an important place for serpentine superphosphate in our manurial programme on crops and pastures.**

Specify

REIDRUBBER

RR

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WORLD'S MILKING WARE

Objections Countered

Farmers, of course, have objected to the idea of compulsion, as we all tend to do, overlooking the fact that when a country is in the throes of war many forms of restriction or compulsion are absolutely necessary in the national interest. The compulsory change from butter to cheese and back is a case. Some farmers say, "Let us have super to revert with lime ourselves," the answer to which is that superphosphate and lime mixed on the farm, according to normal farming practice, does not lead to reversion on any large scale and therefore to the desired saving of phosphate, while if the mixing is brought about in the works the reverted phosphate so produced is not, in our opinion, as effective in the soil from the point of view of phosphate-saving as the reversion to magnesium phosphate brought about by proper treatment with serpentine.

The most frequent objection to serpentine superphosphate now heard up and down the North Island is one the correction of which is entirely with the manufacturers. Concession must be made to them in that they have had to deal with a somewhat new situation with equipment that, owing to war conditions, was probably not entirely satisfactory for the purpose. In some cases serpentine has not been sufficiently finely ground. In some cases possibly serpentine of rather low grade was used. Again, I have seen many samples in which the final product bagged up for distribution had not been crushed sufficiently finely after setting. **All these defects are capable of being remedied and will be remedied if the regulations gazetted by the Government are enforced; and farmers are now demanding that they be enforced by efficient inspection of materials at the works and by the taking of samples of the serpentine superphosphate by inspectors of fertilisers.**

Again, some farmers have been led to believe that serpentine superphosphate is expected to take the place of lime and superphosphate, but this is not claimed for it. Where lime is essential to fertility, as is the case in many parts of the North Island, particularly of North Auckland, then lime should certainly be used, and the only fair test there is between lime and super against lime and serpentine super.

In comparing the results generally obtained today with those obtained from topdressing three or four years ago it has to be remembered that the quantity used is now, under rationing, little more than a quarter of what was available in the pre-rationing years. **It is obviously quite unfair to compare the results obtained from a good quantity of superphosphate or any other kind of phosphate with the results obtained from one-third of the quantity of serpentine superphosphate.**

Favourable Opinions

Much has been heard from a few users who, for one reason or another, are dissatisfied. Little has been heard of the satisfied users, of whom there are plenty. Here are extracts from some letters:—"My experience with this fertiliser is very satisfactory; in fact I would go so far as to say I prefer serpentine super to straight super, and the statement is made after a thorough try-out since it first came out and 25 years' practical farming, using all kinds of manures." That comes from Thames Valley, and here is one from Paeroa: "I am very pleased with the results from serpentine super this autumn. I topdressed a field at the end of December prior to a light rain. After the February rains it simply shot away, and though I had missed the paddock with manure the previous year it now looks the best field on the farm." Still another experience: "I have previously used 15 cwt. lime and 3 cwt. super, but never have I got the results that serpentine super has given me. Personally I find serpentine super better than straight super; straight super gives in this district a yellow-green colour to the pasture and the pasture does not mat. The action of serpentine super is much like I got with Crown basic slag. It appears to me there is something in serpentine very beneficial to this country. I am delighted with the result."

I have seen the results of experiments conducted by the Department on farms in Northland—18 of them—and in only one case does serpentine super suffer in the comparison, and that only slightly. In my recent tour north I found plenty of satisfied users, but these, naturally enough, have not thought it necessary to make themselves heard.

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Crop Subsidy of £5 an Acre for Winter Pig Feed

There are lots of theories associated with the development of the pig industry, but growing crops is the only solid fact that makes the production of more pigs an economic possibility, and the only certain way of making producers more or less independent of high-priced imported pig feeds.

THE full significance of winter crops for pigs is not what amount of pig-meat can be produced per acre, but to what extent it can be responsible for the efficient use of dairy by-products when these commence to become available in the spring.

It is not generally realised that more than one-third of all the pigs slaughtered, together with all the breeding stock, have to be carried through the winter months, of 120 days, on a combination of high-quality-low-quality feeds, and the low-quality feeds—roots and forage crops—must form the principal feed supply during the winter months.

Failure to carry store pigs and breeding stock in the winter results in a wastage of dairy by-products in the spring and summer months, because of there being insufficient pigs on hand to use them.

Details of Scheme

As part of the Government's recently-announced plan for stimulating pig production there has now been introduced a crop subsidy scheme for pigs. The details of this scheme have been finalised in conjunction with the National Pig Industry Council, and are as follows:—

The crops eligible for the subsidy are:—Carrots, kumikumi, pumpkin, pie-melon, sugar-beet, silver beet, mangolds, swedes, artichokes, chou mollier, peas, maize, and barley. The subsidy will be £5 per acre for the crops specified above, and these crops must be fed on the farm where they are grown. Application for the subsidy is to be made only to District Pig Councils, on a form on which the applicant states the crop he has sown specifically for pig feed, the area, and the number of pigs he anticipates feeding.

The application form will be in two portions. The first portion is a notification of the farmer's intention to claim the subsidy. This form must be sent to the District Pig Council as soon as the crop is reasonably established, and between September 1, 1944, and March 1, 1945. The second part is the formal application, setting out the crop and the area and the number of pigs on hand. This must be sent to the local District Pig Council approximately 14 days before the crop is fed off to the pigs, and in no case later than June 30, 1945, even if the crop is to be used after that date.

Checking Claims

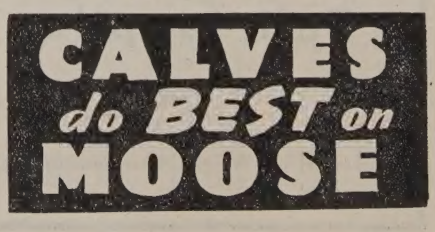
The whole responsibility for approving and checking claims is given to District Pig Councils, and at least one member and the supervisor of the local District Pig Council, or other authorised person, must endorse each claim. Should any dispute arise regarding the claim between the District Pig Council and the farmer concerned, it will be referred to the Primary Industries Controller for settlement, and his decision will be final.

The subsidy will be paid on crops even if the crop does not come to maturity, provided it can be shown that the crop was sown and cultivated in accordance with the principles of good farming practice. It will be paid on every area of crop which is grown specifically for feeding pigs and which is fed during the period from April 1 to August 31, provided there are ten pigs, of any age, to each acre on which the subsidy is claimed. For the purpose of calculating the number of pigs likely to be carried, every sow due to farrow before July 31, 1945, will be counted as seven pigs; in other words, it is assumed that every sow due to farrow before that date will rear six pigs. Feeding dates outside the period stated will be at the discretion of the District Pig Councils.

Applications

Application forms for the crop subsidy will be available after September 1, 1944, and can be obtained at local offices of the Department of Agriculture, and from Dairy Companies and District Pig Councils.

It must be perfectly clear that both the application form and the claim for subsidy are to be returned to the local District Pig Council, who will be responsible for the inspection of the crop. The council is the only body authorised to collect the application and recommend payment of the claim. These forms will contain complete details of the conditions governing payment of the subsidy and the instructions for claiming the amount due in accordance with the particulars of the scheme as stated here. Now that the scheme is finalised every farmer should plan his pig production for next season, with the knowledge that a cheap feed supply will be available on his own farm.



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SEED CERTIFICATION

Summary of Operations for Seasons 1938-39 to 1942-43

This is the first annual summary of operations relating to the certification of the various field crops and grasses and clovers to be published since the outbreak of war and it should accordingly prove of more than usual interest.

— By —

J. A. S. MILLER,
Assistant Seed Certification Officer, Fields Division, Wellington.

THE war brought some modifications to the scheme of seed certification but, as will be seen from the table, there has been no reduction in the quantity of seeds certified. In some instances there have been marked increases. A feature of note is the production under official supervision of turnip and swede seed, chou moellier, kale and mangold seed. While this seed is not at present "certified" in the true sense of the word the seed is officially recognised as "Government approved," indicating that it may be sown with full reliance as to the strain or variety. As soon as selected strains are available full certification will be given to these seeds.

Certified onion seed makes its appearance for the first time in the table. The variety certified is of the Pukekohe Longkeeper strain, a good-yielding and long-keeping variety originally developed by a private grower in the Pukekohe district.

Government Stock Seeds. — During the past two seasons sufficient Government Stock white clover and Italian ryegrass seeds have been produced to satisfy the demand. Perennial ryegrass and Montgomery red clover seeds of this class are still in short supply, but the quantity available, if utilised to the best advantage, is ample to maintain full supplies of certified seed in the lower classes. Last year saw the distribution for the first time of Government Stock "H1" ryegrass. This is a strain developed to produce a relatively large amount of feed of high palatability over a period of two to three years. Government Stock cocksfoot seed is still being distributed by Canterbury Agricultural College and is of a strain which is increasing in popularity.

Perennial Ryegrass.—Apart from that certified under the ultra-violet light test this seed is all of the pedigree strain, that is, it is all derived from areas sown with Government Stock seed. This strain is superior to the "natural" strain which supplies the reason why seed of the natural strain has been eliminated from the higher classification. Paddocks producing seed of the natural strain which was formerly certified in the Mother class now produce seed which is eligible for certification in the Permanent Pasture class, which class also contains an increasing proportion of seed of the pedigree strain.

Germination has fluctuated from good to bad during the period under review and is still the major problem in the way of producing good perennial ryegrass seed. It is to be hoped that the investigation work which is being carried out on this problem will lead to some control over this undesirable feature.

Cocksfoot.—The yield of certified cocksfoot seed has remained fairly constant over the past four years, though it has never attained the figure reached in 1936-39, when nearly a million pounds were tagged. The Akaroa source of supply is very irregular and in most seasons difficulty is experienced in obtaining even the minimum standard of purity required for certified seed. The Ashburton County now produces approximately half the certified seed, but the southern districts are also rapidly extending in this direction. Cocksfoot seed of pedigree strain is now well established and is increasing in popularity.

White Clover—The production of this seed under certification reached a new height when over a million and a half pounds were certified last season. The bulk of this seed was tested and certified under the picric acid method and classified as Mother or Permanent Pasture, according to the reaction. There has been a steady increase in the amount of pedigree seed produced and now that the demand for Government Stock seed is being met there is reason to believe that the multiplication of seed of the pedigree strain will proceed apace.

Browntop.—As this species is dependent on seasonal and economic factors for harvesting the quantity certified varies from year to year. There has been no change in the method of certification of this seed.

Montgomery Red Clover.—There appears to be no limit to the demand for this seed, as witnessed by the phenomenal increase recorded in the table. The importation of English-grown seed has ceased and it rests with this country to produce sufficient seed to fulfil its own requirements. In this connection the development of a pedigree strain to suit New Zealand conditions is of particular moment. The extension of the saving of seed in the Southland districts is interesting, as weather conditions there have been considered anything but favourable for the harvesting of this type of seed.

Broad Red Clover.—The quantity of seed produced is relatively small and remains more or less constant. The strain concerned is that which has long been grown in New Zealand, but the development of a selected strain is well under way.

Italian Ryegrass. — Last season marked the production commercially of seed of a pedigree strain. This strain is definitely superior to the type upon which certification was previously based and alterations to the scheme of certification are being made which will ultimately lead to the replacement of all seed of natural strain with seed of the pedigree strain. The amount of seed certified has shown a steady increase from year to year, though according to the recorded production of uncertified seed there is still ample room for further increase.

Seed Wheat.—An important change in the system of seed wheat certification was made on account of war conditions. Only seed from specially selected areas is now eligible for re-entry into certification, the aim being to inspect areas sown with seed as little removed from hot water treatment as possible. By this means the fullest use is made of the best lines of wheat available, at the same time restricting the number of areas to be inspected to a bare minimum. This alteration has had the effect of reducing very considerably the acreage inspected each season, while at the same time reasonably maintaining the quantity of seed finally certified. Further, the quality of this seed is now higher than formerly, due to the altered conditions of certification.

Seed Potatoes.—There is no change to report in the method of certification of this crop. Quality continues to be maintained and even to be improved. The presence of foreign varieties has

TOTAL PRODUCTION AND ESTIMATED VALUE OF SEEDS FINALLY CERTIFIED, SEASONS 1938-39 TO 1942-43.

Seed.	*Chief Consideration Upon Which Certification is Based.*	1938/39.	1939/40.	1940/41.	1941/42.	1942/43.
Potatoes (tons)	Varietal purity, cropping power and freedom from virus diseases	2,641	2,820	2,468	1,850	2,845
Wheat (bushels)	Varietal purity and freedom from loose and stinking smuts	59,619	71,450	*29,418	29,740	48,384
White Clover (lb.) ..	Genuine high producing perennial type of pedigree and natural strain	452,582	499,338	1,237,297	1,190,539	1,666,141
Perennial Ryegrass (bushels)	Genuine high producing perennial type of pedigree and natural strains	229,637	437,669	411,247	365,216	260,094
Browntop (lb.)	Freedom from redtop (A. alba) and coarse types of browntop	612,345	279,738	188,380	252,534	247,323
Cocksfoot (lb.)	Genuine high producing perennial type of pedigree and natural strains	991,673	275,432	439,823	234,041	273,948
Montgomery Red Clover (lb.)	Type conforming to that of English-grown Mont. red clover	143,499	130,692	256,318	362,694	923,879
Rape (lb.)	Varietal purity	19,917	333,648	792,624	1,138,592	433,888
Italian Ryegrass (bushels)	A rapid-growing, high-producing type showing recovery after cutting	10,380	26,374	60,176	56,028	63,859
Phalaris Tuberosa (lb.)	Freedom from other species	12,746	2,774	1,995	—	—
Broad red clover	True broad-leaved hay type		19,018	24,046	34,723	14,742
Onion (lb.)	True Pukekohe Longkeeper type			6,143	9,102	15,806
Turnip and Swede (lb.)	Varietal purity and freedom from seed-borne diseases			56,854	324,694	385,211
Kale (lb.)	Trueness to type				8,676	23,107
Chou Moellier (lb.) ..	Trueness to type				38,540	27,964
Mangold (lb.)	Varietal purity				50,760	22,190
Estimated Value of Seeds finally certified		£268,425	£453,162	£563,086	£570,037	£662,944

* Reduction accounted for by changes in the regulations.
Total estimated value of seed certified (1932/43), £3,447,958.

been reduced to a minimum and virus diseases are being kept well in check. Aucklander Short Top is still the principal variety, with Arran Chief and King Edward in second place. A notable feature is the gradual displacement of Dakota from its original place as the most common variety in certification. This has been due to its inability to resist virus diseases with consequent loss of cropping power, the most important qualification for certification. The fact is unfortunate as Dakota has been one of the most useful varieties.

Rape Seed.—The certification of rape seed has reached a stage where the supply is now sufficient to fill the demand and on occasion to meet overseas enquiries also. With the falling off of this export demand, however, it is probable that production will be materially reduced.

Onion Seed.—This is confined to the certification of the Pukekohe Longkeeper variety and, owing to overseas enquiries, there has been a steady increase in the amount of seed certified since the introduction of the scheme. With only a local market now to cater for, however, reduced production is anticipated. The variety is now well known and is becoming very popular with producers and home gardeners.

Turnip and Swede Seed.—The outbreak of war and the consequent cutting off of supplies from the United Kingdom rendered the local production of these seeds imperative if the supply was to be maintained. This work has been undertaken under Departmental supervision from the sowing of the crops to the final packeting of the seed to ensure that varietal purity is maintained. The number of varieties has been reduced in order to simplify the work, but the main groups have been retained so that there is a variety to suit each district and preference.

Kale, Chou Moellier and Mangold Seed.—These species are also grown under official supervision and similar remarks to those above also apply to them.

This space was reserved for

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but owing to the fact that they are busily engaged in the more important task of increasing production of their high quality Vegetable and Farm Seeds they have not time to write an elaborate advertisement; but they wish you to be assured that they are, as usual, concentrating on the reselection and improvement of their various stocks and strains of which there will be sufficient seed available for normal requirements.

General

The above table gives the quantities of the various seeds certified for every year since the season 1938-39. It should be noted that the table includes only seed in a machine-dressed or graded state and does not include seed harvested but not submitted for machine dressing or (in the case of potatoes) tuber inspection. The estimated value of the seed produced in each season is given at the foot of each column.

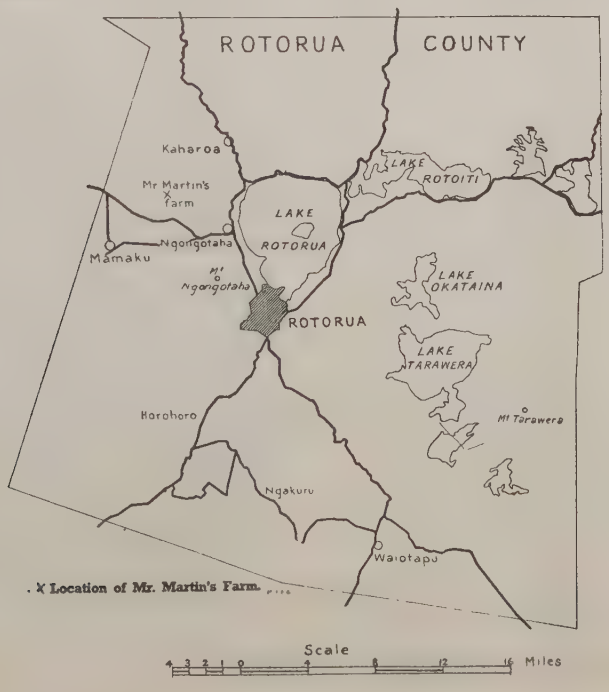
STUDIES IN FARM MANAGEMENT

THE pumice lands in the central districts of the North Island, although long neglected for settlement, have proved to be quite suitable for development into dairy and sheep farms, provided adequate attention is paid to the sowing of truly perennial strains of grasses and clovers and fertility deficiencies are made up by topdressing.

— By —
C. R. TAYLOR,
Fields Instructor, Rotorua.

ROTORUA County consists of a high plateau up to 2,000ft. in elevation, broken in the lakes district by a depression with an elevation of 1,000ft. and in the north falling in a series of broken hills to the coastal plain of the Bay of Plenty. All the soils are volcanic and consist of various volcanic ash showers, and vary considerably in fertility. The high elevated plateau was originally clad in the rimu-tawa type of forest, and the lower areas in tussock, scrub, and fern.

Farming first developed on the bush areas, but was unsuccessful owing to the occurrence in ruminants of a mineral deficiency disease known as "bush sickness"; this is now successfully treated by pasture topdressing with cobaltised superphosphate. The open tussock and scrub-covered hills and plains were long looked on as useless for farming, but with the advent of certified perennial strains of ryegrass and white clovers it was demonstrated that high-class dairying and fattening pastures could be established and maintained, provided adequate phosphate topdressing was applied.

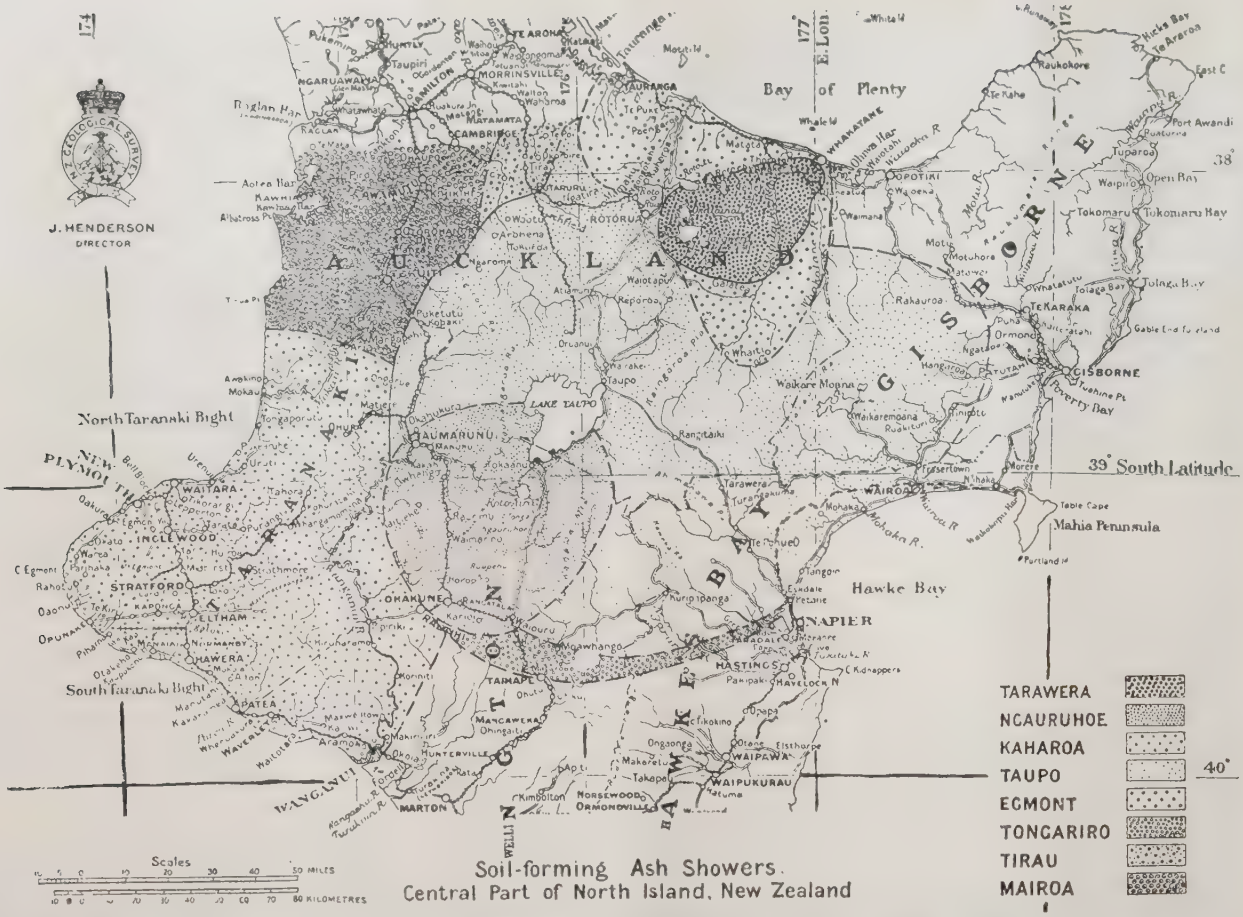


Climate

Climatic conditions recorded over a number of years appear to be fairly constant. The average annual rainfall for Rotorua district is slightly in excess of 50in., wet days numbering about 140. Winter weather conditions are mainly characterised by a series of fairly severe frosts commencing in late April and continuing on and off to August. Unseasonable frosts of some severity are sometimes experienced in December and again in February. These do not occur every year, however. Late spring, summer, and autumn conditions can usually be described as pleasant. Mean temperatures are sufficiently high for good growth, but not so high as to be insufferably hot and oppressive. Pastures may be successfully established either in the spring or autumn, but the latter period is more commonly favoured.

Soil Types

The soils of the Rotorua County are, of course, all of volcanic origin, and are generally and broadly described as pumice soils. Not all pumice soils are the same, however. They vary considerably in texture in accordance with the manner in which they have been laid down—that is, whether they have been air-borne or water-borne from the point of volcanic ejection. Moreover, their richness or poverty in mineral matter essential to plant and ani-



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mal life very largely depends upon their source of origin. Hence, although the Rotorua County comprises a comparatively small part of the total area of the North Island, it is sufficiently large to have become vitally affected by several different volcanic-ash showers as illustrated on page 10.

It is important to note that not all of the land shown within the boundaries of the Kaharoa and Taupo pumice-ash showers is necessarily deficient in cobalt to the extent of causing bush sickness in ruminant animals. Modifying factors such as swamps and admixture with underlying showers are responsible for considerable variation in the degree of cobalt deficiency, especially outside of the Rotorua County.

The Kaharoa shower which covers the northern part of the county consists mainly of a relatively coarse gravelly sand with a little fine soil mixed in with it. In its natural state it lacks phosphoric acid and cobalt, a deficiency of the latter mineral causing a condition in ruminant animals known locally as bush sickness. Fortunately both of these minerals can readily be supplied to the land by topdressing with cobaltised superphosphate or cobaltised serpentine-super. As much of this territory is bush country it is not badly situated in the matter of nitrogen. In any case clovers grow so exceedingly well following moderate applications of phosphatic fertilisers that any original nitrogen deficiency there may be is soon made good. Perennial ryegrass frequently does not do too well for a few years on this soil type, due to its lack of consolidation, but cocksfoot, timothy and other grasses, together with red and white clover, grow splendidly. This is one of the coming sheep and dry-cattle districts of the Rotorua County. Dairying is also carried on to some extent with moderate success. A small part of the Kaharoa shower also occupies the south-eastern corner of the county, but this is planted in exotic forests. The normal topdressing practice is to use from 2 to 3 cwt. cobaltised super or serpentine super per acre annually. The need for lime is not indicated by experimental data.

Taupo shower.

The Taupo shower occupies roughly a third of the county. It is geologically a good deal older than the Kaharoa shower and this fact, together with its generally much finer texture, accounts for its favourable acceptance as a soil type worthy of intensive development into small, highly productive dairy farms. Phosphoric acid, nitrogen, and in a small degree cobalt are all deficient in the Taupo ash soil, but as stated previously these are very easily supplied through the agency of cobaltised phosphates and clovers. Properly managed, this soil type will hold a good ryegrass-white clover sward for many years, and in such circumstances there is no difficulty in carrying a dairy cow to 2 acres. The natural vegetative covering is principally bracken fern, tutu, tussock, monoao and somewhat stunted manuka. A certain amount of native bush also occurs in odd places, more particularly in the Mamaku district. An adequate topdressing for this soil type is 3cwt. cobaltised super or serpentine super per acre annually. Lime appears of little value in the production of a satisfactory pasture sward, although it may benefit the grazing animal.

The last pumice-ash shower of any consequence that need be considered here is the recent eruption of "mud" material deposited over an appreciable area of the eastern portion of the Rotorua County as the result of the Tarawera upheaval of 1886. This soil type is light grey in colour, very fine in texture (hence the description "mud"), and relatively fertile in the natural state in comparison with the Kaharoa and Taupo showers. It lacks phosphoric acid and to some extent nitrogen in its raw condition, but lime, potash, and cobalt appear to be present in plentiful quantities. A phosphatic fertiliser such as superphosphate or serpentine super is the only kind of soil dressing required to maintain thriving pastures of the ryegrass-white clover type. Fat lamb raising and dairying are largely practised in the eastern district influenced by the Tarawera mud covering. Very satisfactory manurial response results from the use annually of 3cwt. super or serpentine super. The need for lime is not indicated by experimental work.

Land Under Occupation

The total area of the Rotorua County comprises something just in excess of half a million acres. Only a very small part of this acreage is, however, being farmed intensively, although according to the latest statistical figures available an area of 245,682 acres is shown as being occupied. Of the occupied area 132,470 acres are described as unimproved, whilst the balance of 113,212 acres is shown as being improved. Even these statistics do not put into proper perspective the farming position of the Rotorua County, and so it becomes necessary to indicate how the improved area is made up. Once again quoting from the previously mentioned statistical returns it is found that 66,841 acres are in permanent grasses and clovers; 2,053 acres are devoted to root crops; 835 acres to other crops **and** 43,453 acres are planted in exotic forests—a grand total of 113,212 acres of improved land; and so it is apparent that very few counties today—if any—possess the vast farming potential of the Rotorua County. The position of the stock population of the county for the eight years ending 1941-42 is as under:—

	1934-35.	1938-39.	1941-42.
Horses	1,342	1,522	1,363
Dairy cows ..	10,356	12,034	10,761
Other cattle ..	12,455	16,056	15,188
Pigs	5,143	5,526	4,519
Sheep shorn ..	35,584	61,289	68,894
Lambs tailed .	21,188	30,797	48,340

Three rather important trends are revealed by the above figures: The first is the 20 per cent. increase in dairy cows between 1934-35 and 1938-39; secondly the 25 per cent. increase in "other cattle" over the same period; and thirdly the very substantial increases in "sheep shorn" and "lambs tailed" over the entire period of six years. The fact that a reduction in dairy cows and pigs occurred during the period from 1938-39 to 1941-42, together with an increase in sheep and lambs, is undoubtedly due to war conditions creating, inter alia, a shortage of man-power and fertiliser supplies. Had it not been for the war it is a safe prediction that the all-round progress recorded in the period 1934-35 to 1938-39 would have continued up to the present time.

Cropping

Annual cropping in the Rotorua County is not extensively practised except in the direction of swede production for winter use. The light, well-drained, but moisture-holding properties of the pumice country make it admirably suited to the growing of first-class root crops, and since this type of cropping works in well with the routine management of the average

VIEWS OF ROTORUA COUNTY

Ngakuru land development block.

Horohoro land development block.

Rotorua district from Mt. Ngongotaha.

Surface sown bush country, Kaharoa.

Carrot crop, Te Ngae.

Swede crop, Horohoro.

local farm it is simple to understand why it has retained its popularity for so many years without sign of flagging. Swedes, soft turnips, and carrots are the chief roots grown, but swedes take pride of place with the production of about 2,000 acres annually, yielding an average of 30-35 tons per acre. Approximately 5,000 acres of hay are saved annually, together with 700 acres of ensilage.

Lucerne is a crop which in recent years has made some progress and promises to become popular. Here again the pumice soils are eminently suited to the culture of lucerne after it has been sown to pasture for a few years. From three to four cuts per annum can usually be taken from a mature stand, each cut yielding from 1 to 1½ tons of hay.

Cereals such as wheat, barley, and oats for grain have been grown quite successfully in the pumice country of the Rotorua County, but very little attention is paid to them nowadays. Algerian oats, black barley, and rye-corn are often employed as a catch-crop for greenfeed, and as such they fill a very useful purpose. Maize is also sometimes grown for feeding out green during the summer months, but generally there is little or no call for supplementary foodstuff for summer feeding.

Pastures

With the principal exception of the State development schemes such as Ngakuru and Horohoro, where for the most part permanent pastures were established on the first furrow from virgin conditions, the greater area of initial grassland development in the Rotorua County was accomplished by first burning off the scrub (bracken fern, small manuka, and tutu) and immediately afterwards discing and harrowing the ash and surface sowing with a pasture mixture very largely comprised of 5lb. red clover, 10lb. cocksfoot, 4lb. crested dogstail, 5lb. Italian ryegrass, and a little white clover. For a strictly temporary pasture up to two years it was, and still is, customary to sow red clover and Italian ryegrass almost exclusively, the rates per acre varying considerably but averaging from 6 to 8lb. red clover and from 15 to 25lb. Italian ryegrass. Approximately 2cwt. superphosphate per acre were used in this class of work.

Such a method of initial pasture establishment, although seldom regarded as final, possessed for the new settler with very little capital the undoubted advantage of enabling the farm to produce at the earliest possible moment with the least strain on his meagre financial resources. In later years these cheaply-grassed areas would be gradually broken up, first for root-cropping purposes, and then resown to a better and more productive type of permanent pasture such as Certified perennial ryegrass 25lb., Certified cocksfoot 8lb., timothy 1½lb., crested dogstail 3lb., red clover 3lb., and Certified white clover 2lb. Then with reasonable grazing and topdressing management these secondary pastures are capable of producing anything up to 175lb. butterfat per acre, sometimes more with a little additional care.

It is very rarely that a permanent pasture can be regarded as properly established and fully productive under two years. Good management is therefore absolutely essential to see that during this period practices are not permitted capable of doing irreparable damage to the young sward. Overgrazing, especially with sheep, will often kill out all the clovers before they are properly developed, and this will ruin the pasture. On the other hand too lenient grazing will result in a weakening of grass species through allowing them to seed, and also encourage a clover-smother which is equally detrimental to the grasses. A fairly fine judgment is necessary to balance these two extremes, but the task is not an insuperable one by any means.

When once established pasture management in the Rotorua County is not unlike that of any other district. Given proper feeding by way of regular topdressing, say, 3cwt. super or serpentine super per acre (in normal times, of course) together with just the right amount of grazing, permanent pastures should remain highly productive for many years. A word of warning in conclusion: A pasture should not be cut for hay more than twice in succession unless positively unavoidable.

A ROTORUA DAIRY AND FAT LAMB FARM.

Mr. K. M. Martin, Central Road, Ngongotaha, first took up the block of land which is now his farm in 1930. At that time, however, the entire area of 86½ acres was still in its native state, the vegetative covering being chiefly bracken fern, small manuka, and tutu. Situated on the fringe of the Taupo pumice-ash shower (see soil map and description of soil type) Mr. Martin's property, in common with a considerable acreage of surrounding country, is undulating in character and for the most part capable of being fairly easily ploughed. Surface streams for the watering of stock are not plentiful (Mr. Martin has none) so reliance has to be placed on water-bores, but wherever these have been drilled they have proved very successful. The distance from Mr. Martin's farm to the nearest railway station (Ngongotaha), dairy factory, and shopping centre is approximately 4 miles by a good, all-weather road.

Prior to Mr. Martin's commencement of farming on his own account he worked for several years on his father's properties. It was undoubtedly during this period—for Mr. Martin, sen., was a well-known and successful rural pioneer of the pumice country—that he gained the sound training in farm management which later was to be utilised to the full in the development and management of his own farm. Asked if there was one thing above all others to which he attributed his success Mr. Martin answered "thoroughness." Moreover, he said, he firmly believed in "farming" his land, not "mining" it. Certainly the results and the general appearance of his property clearly indicate that here is a man that understands the meaning of good husbandry; and what Mr. Martin can do in a period of 14 years others can do if the will to succeed is never allowed to become clouded by other issues.

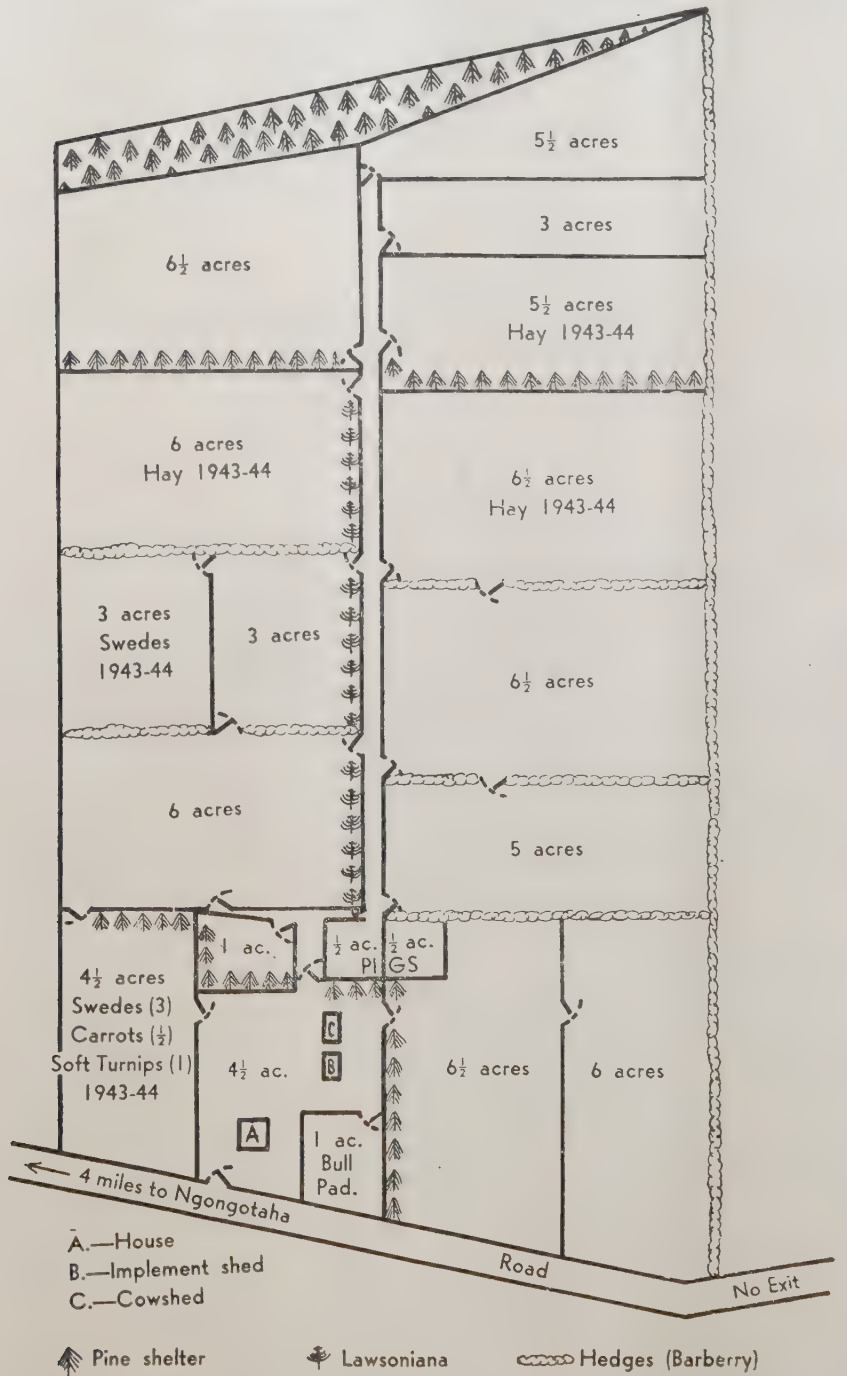
Development

Mr. Martin took over his 86½ acres of undeveloped country in the spring of 1930. With the view to getting into production as soon as possible the whole of the area was first burnt off without any scrub cutting. Next, such larger manuka and tutu that was not adequately disposed of in this way was cut, gathered into heaps, and fired. Following this operation the block received a double cut with the discs and one stroke of the chain harrows. At first the tripod harrows were used, but these were found to clog up badly and so were replaced with chain harrows. No rolling was done.

A satisfactory seed-bed having by now been secured a mixture comprised of 10lb. cocksfoot, 5lb. Italian ryegrass, 5lb. red clover, 1lb. white clover, and 1lb. crested dogstail (22lb. in all) was distributed with 2cwt. superphosphate and chain-harrowed in. This work was completed by the late spring of 1930, by which time it was evident that in the earlier sowings a very satisfactory strike of all species had been obtained. Perennial ryegrass had been purposely left out of the seed mixture, partly because at the time it was not regarded as worthy of inclusion on account of its relatively short life under the shallow surface cultivation method of land development here employed, and partly because Mr. Martin intended at a later date gradually to plough, crop and regrass with a more comprehensive permanent mixture as he could afford it. In this connection it is interesting to note that at present all but two paddocks at the back of the farm have been treated as just mentioned, and these two fields are carrying such a wonderful sward of cocksfoot and white clover that Mr. Martin is reluctant to plough them owing to the feed they produce over that somewhat difficult period resulting from hot, dry weather.

With the completion of the work described above what may be termed initial development was brought to a

close. The area, which had previously been ring-fenced, was now sub-divided into three large paddocks in such a way as to permit of further sub-division along pre-planned lines, but incapable of immediate fulfilment due to lack of finance. Water was provided by means of a bore drilled to 245ft. and dairying was commenced in the spring of 1931. But more of this activity later, as it is desirable to conclude the section on development by reference to the secondary phase that ultimately was to transform the original pasture sward from a semi-permanent type to one of a permanent nature with ryegrass and white clover dominant.



Plan of Mr. K. M. Martin's farm. Scale ¼ inch to 1 chain, 81 acres in grass, crops, pig lay-out etc., 5½ acres in shelter-belts, plantations, roading and buildings. Total 86½ acres. 24 well-hung wooden gates on the farm.

To people unfamiliar with the peculiarities of the pumice country of the Rotorua County it may appear strange that Mr. Martin did not first of all sow to permanent pasture and have done with it. The reasons for his not doing so, however, were ample and sound for one with limited working capital and included (1) insufficient finance to complete permanent grassing in a short time; (2) the realisation that the sooner stock could be run over the entire area of farm the sooner the soil would attain a sufficient degree of consolidation and enrichment to maintain a good sward of permanent grasses and clovers; (3) the knowledge that the pumice soils of the Rotorua district, in common with similar soils of adjacent localities, normally lack humus and nitrogen. Therefore a short-term pasture sward consisting largely of red clover and some white clover would quickly build up the nitrogen content of the soil and in a few years when this pasture was ploughed under a tremendous amount of vegetable matter would be made available for use by subsequent crops, and (4) the experience of past years had abundantly demonstrated the impossibility of securing a successful swede crop, the backbone of winter supplements in the pumice country, on the first furrow where stunted scrub and fern formed the natural vegetative covering of the soil type being handled.

Hence, in about 12 months from the time of first sowing down Mr. Martin has each season since broken up and cropped between 5 and 6 acres with roots, mainly swedes. Following this type of crop, which is usually finished in October, the land is kept well worked with discs and harrows until December and then sown to blue lupins at the rate of 2 bushels per acre without manure. The lupins are used to restore and build up the humus and nitrogen reserves of the soil, and Mr. Martin considers this practice essential to high production and carrying capacity. Usually by the end of the following February the lupins, which are then in flower, are ploughed in and disced and left to rot down for 3 weeks. A thorough discing and harrowing are then given the area to ensure that the decomposed lupin is well mixed with the soil. Sowing to permanent pasture is immediately proceeded with, weather permitting, so as to be completed by March 15. Mr. Martin's pasture mixture for this purpose differs considerably from his original one, and is as follows:—

Cert. perennial ryegrass ..	20 lb.
Italian ryegrass	5 „
Cert. cocksfoot	10 „
Red clover	3 „
Timothy	2 „
Cert. white clover	1 „
Crested dogstail	1 „
	42 lb.

When fertiliser was available 3cwt. super per acre were sown with the above mixture and this quantity plus the lupin and generous cultivation was found sufficient to promote successful establishment and maintain optimum growth over the following 12 months.

Pasture Management

Reference to the plan of the farm reveals that no paddock exceeds 6½ acres, and it is Mr. Martin's ultimate goal to have all of his fields approximately 3-4 acres each, as he is a firm believer in rotational grazing, involving rapid feeding off and long spells for recovery. During the winter period when dairy stock are being fed supplementary rations of roots and hay the area of grassland made available to these cattle is very restricted, the idea being to confine them to the smallest possible acreage consistent with their welfare for the purpose of accumulating concentrated quantities of dung and urine on those pastures intended for hay later on. The dung is regularly harrowed every few days as the need becomes apparent. Breeding ewes are then given the run of the remaining paddocks, generally from June to about the end of September, at the rate of approximately 1 ewe to ¾ acre. A few sheep carried on a dairy farm have been found to exert a very beneficial influence on what may aptly be called "cow" pastures in that they thicken up the sward, greatly stimulate ryegrass growth, and remove all trace of tuftiness; but Mr. Martin insists that they must be well managed.

From the time the spring growth comes away in earnest and the feeding of winter supplements to the dairy stock is no longer necessary the breeding ewes are confined to an area of 14 acres. The dairy herd is then allowed run of the balance of the farm except for 18 acres shut up for hay until December, 5-6 acres required for swedes from November to the following winter, 1-1½ acres sown to soft turnips in mid-November for feeding out to cows in February, and 5-6 acres previously in swedes and not available for grazing until the following spring when the autumn-sown grass is firmly established.

Topdressing practice normally involves an annual early-February application of 3cwt. superphosphate per acre over all the farm, and every two years each paddock receives 7cwt. of lime, half the farm being limed one year and the other half the following season. Stockyard manure is regularly carted out and distributed over pastures, particularly over hay fields if practicable, whilst the chain harrows to spread animal manure are constantly employed on this work. Mr. Martin places considerable emphasis on this latter practice and considers that much of his success is due to it.

Topping of pastures is carried out whenever necessary to prevent excessive seeding of grass and clover species, and to control weed growth such as Californian thistle.

Supplementary Feed

Every effort is made to provide ample reserves of hay and root crops to carry stock over those periods of the year when pasture growth is insufficient to meet the full requirements of the grazing animal.

Mr. Martin has always believed in having a fair surplus of hay over from each year. He therefore cuts 18 acres each season, or approximately one-fifth of the farm is set aside for this purpose for from 2½ to 3 months, according to weather and other conditions. The hay saved is about 50 tons, or 1 ton for each cattle beast (inclusive of young stock) wintered on the property. When practicable no pasture is cut for hay twice in succession, but this is not always possible owing to certain paddocks being unfit for mowing. Very generous manurial treatment is given to hay paddocks in that besides an autumn topdressing there is also a spring application of 3cwt. of some phosphatic fertiliser. It is also Mr. Martin's practice to feed out winter supplements, viz., hay and roots, on those paddocks to be later saved for hay for the purpose of accumulating on them all the animal manure possible. Hay is always cut in

VIEWS OF THE FARM

Centre of farm showing shelter belts.

Homestead and root crops.

Swede crop, Lake Rotorua in background.

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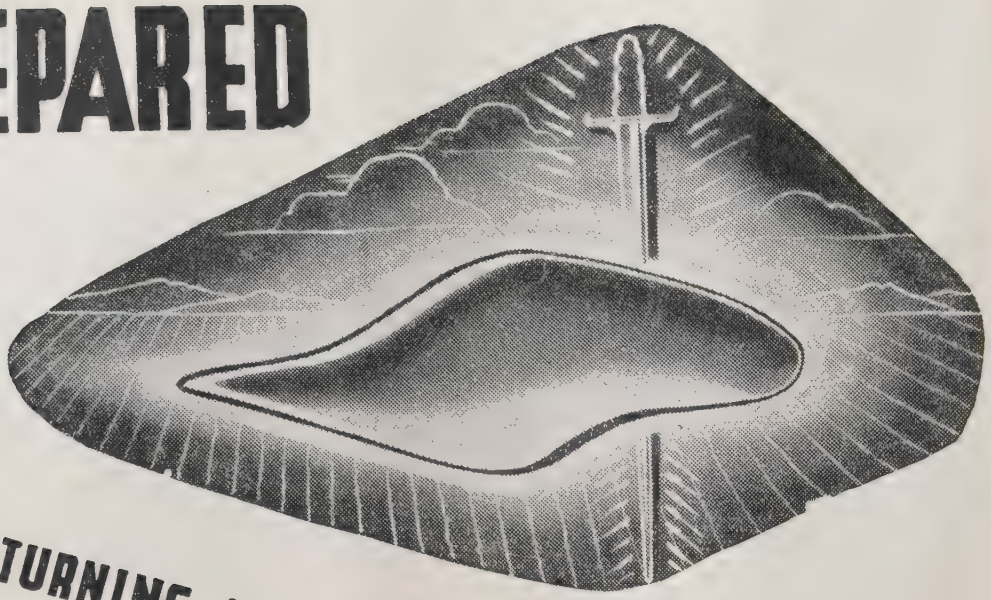

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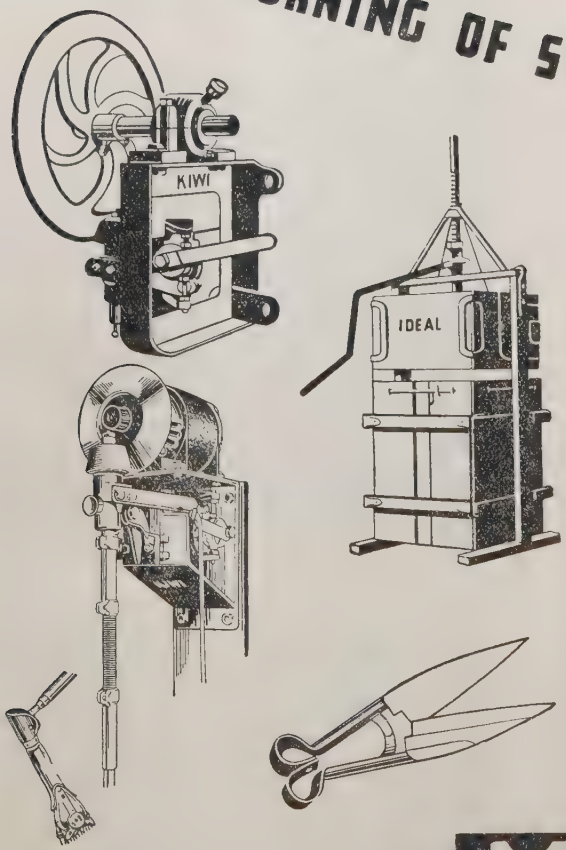

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December before it has reached an over-matured condition, that is, in the early flowering stage when leaf growth is at its maximum. Harvesting operations are very thorough and as will be seen in the photographs accompanying this article no risk is taken with the weather spoiling the material in the completed stacks. Feeding out usually commences in June.

For root production—mainly swedes, although red carrots and soft turnips are also grown to some extent—Mr. Martin is very thorough in the method he employs. Between 5 and 6 acres of swedes, 1½ acres of soft turnips, and ½ acre of red carrots are grown each year, and excellent crops are always secured. The ground is taken in hand during late May to early June by skim ploughing 3in. deep. It is then allowed to fallow until the beginning of October, after which it receives a double cut with the discs set with plenty of "cut." At the end of October a double-angle cut with the discs, together with a few strokes of the tine harrows, completes the first phase of preparing ground for root crops.

The final phase commences early in November by a second ploughing 5in. deep aimed at burying well the decomposed vegetation resulting from initial skimming of the pasture sward. A stroke or two with the tine harrows is then sufficient to produce an excellent seed-bed for the type of crop to follow. Note that at no stage in the preparation of the seed-bed is a roller used, Mr. Martin much preferring to leave the surface of his land in a crumbly condition.

The rate of seeding for swedes is 1lb. per acre. This quantity is sown through a drill in shallow 14in. rows and manured with 3cwt. super or serpentine super per acre. Borax to control mottled heart disease is employed at the rate of 10lb. per acre and is distributed 2 weeks before drilling the seed.

The varieties favoured are Superlative and Regal, 50 : 50 of each kind. Swedes are usually sown the first week in December and they are later fed off in very small breaks to avoid wastage. The average yield is 40 tons per acre.

Soft turnips grown for February feeding are treated in a similar manner to swedes and the same quantity of seed is used. The variety grown is Imperial Green Globe and this is sown in part of the swede ground, but about 3 weeks ahead of the swede crop. Soft turnips are always pulled and carted out to stock as required.

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The small area (¼ acre) of carrots grown each year is intended partly for stock and partly treated as a cash crop. The crop is produced under exactly similar conditions to swedes and soft turnips except that 4lb. of seed are used instead of one, and it receives one hand hoeing. The variety sown is Guerande.

Dairying Activities

Mr. Martin worked for his father for some years on a share-milking basis and it was during this time that he saved as his share of the calves reared the 27 two-year-old Jersey cross heifers which gave him his first start, and which were destined to be the foundation of his herd in after years.

Always a keen advocate of herd testing, Mr. Martin has now been testing continuously for 13 years. For one year he topped his group with an average of 377lb. butterfat from 36 cows without any forced feeding, but simply under ordinary herd and farm conditions. He has also been well towards the top of his group on many occasions. Factory returns from 36 cows over several seasons average 11,000lb. fat, or 305lb. per cow. This average also results in a figure of 210lb. fat per acre of actual grassland available to the dairy herd.

The breed of cow favoured by Mr. Martin is the heavy-framed Jersey, as he considers that this being a more rugged type than the lighter-boned members of the same breed it is better fitted to withstand the rigours of the local climate. For mating purposes only the best pedigree Jersey bulls with the necessary butterfat backing are selected, and line breeding is followed fairly closely. The bull is never permitted to run with the dairy herd, all cows requiring attention being separately attended to.

About twelve calves are reared each year, and in choosing them full consideration is given to consistency of production of dams and their freedom from diseases such as T.B., mastitis, and abortion. As it has been customary to require only five or six heifers annually to maintain the herd at about 36 head, a further choice is possible from the twelve calves saved when they approach the profit stage. The balance are cashed in in accordance with the usual practice.

Calves are fed on whole milk for two weeks, and half and half for a further two weeks. From a month old until four months of age calves receive skim milk only. At no stage, however, are they over-fed on milk, but they are encouraged to eat as much good quality hay as possible. Good clean pastures are always set aside for calves so as to minimise the risk of parasitic infection.

With regard to calving date of cows, Mr. Martin considers that as he has to feed them well he might as well milk them also. Consequently he endeavours to have them come to profit as close to July 15 as possible. The herd is then in a position to take full advantage of the early spring feed and come to its peak production during October-November. Cows are rested for two months each season.

Pig Management

For every six cows one sow is kept, and on Mr. Martin's farm there are six sows. From time to time he has tried many different breeds, but for a number of years now he has favoured pure-bred Devons mated to a pure-bred Berkshire boar. The progeny have been found to be good-tempered and grow quickly, whilst producing a satisfactory type of carcass.

Each sow produces two litters a year, in May and December, averaging eight piglets to each litter. Approximately 66 per cent. of each litter are cashed in as weaners, and of the balance Mr. Martin takes the May litters to bacon weights, while the December ones are disposed of as porkers.

Pigs are fed regularly, between four and five times a day, as Mr. Martin is convinced that a little food at a time and given frequently produces far greater dividends than the same total quantity of food fed twice daily. Each pig receives daily a basic ration of skim milk with up to ½-lb. meatmeal,

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according to age. Towards the end of the fattening period ½lb. barley meal is added to the basic ration, but extreme care is taken to see that pigs do not put on fat too quickly, resulting in the production of a second-grade carcass.

From early May to early September, when the milk supply is not too plentiful but roots are available, each pig is allowed swedes ad lib., and from 2 to 3lb. carrots daily. An adequate area for grazing is provided for all pigs in the lay-out adopted.

Fat Lamb Raising

In addition to dairying, which is Mr. Martin's chief activity, and its accompanying sideline, pigmeat production, a very useful revenue is also acquired from the carrying of 75 Romney breeding ewes mated to Southdown rams. The ewes are generally purchased in February as 5-year-olds and the best of them kept for two seasons, the rejects being disposed of as fats. Lambing commences in early August and, with very few exceptions, the 90 to 95 per cent. of lambs dropped each season are sold as heavyweight milk lambs during December. For the most part these animals are grazed on 14 acres especially set aside for their use, as indicated in the section "Pasture Management."

Fattening Bought-in Store Lambs

To cope with the autumn flush of feed and utilise it to the utmost, Mr. Martin's practice is to purchase up to 125 good store lambs when they become available after Christmas. These lambs, which have access to the dairy paddocks after the cows have had the initial grazing, are usually fattened and sold by the middle of May. Thus at no stage do they interfere with the interests of the dairy herd; rather, perhaps, is their influence all to the good, for they undoubtedly improve the pasture sward and increase its growth.

Shelter

The provision of adequate shelter on a farm is regarded by Mr. Martin as most essential, for not only do stock directly benefit, but pasture growth comes away earlier in the spring and is maintained longer into the winter wherever there is suitable shelter. *Pinus radiata* is favoured where a quick growth of temporary shelter is desired or wherever a tall-growing breakwind is necessary. *Lawsoniana* and seeding barberry are otherwise largely planted for permanent hedgerows of medium heights and good density.

Water Supply

An excellent water supply derived from a bore drilled to a depth of 245ft. and operated by a high-pressure automatic pumping system provides water in every paddock on the farm. The whole system is stated to be very reliable and was installed at a cost of £3 per acre inclusive of concrete troughs and ball-cocks. Maintenance charges so far have been very low.

Farm Buildings

Buildings include a 4-bail cowshed, with concrete floor and holding yard, and a separator room attached. There is also a manure and implement shed, and seven small "A" roofed houses for pigs, together with a fattening pen of simple design. All buildings are well maintained.

Equipment

The equipment includes a two-cow milking plant, a 75-gallon separator, and a hot-water cylinder, all electrically operated. For actual farm work there is a single-furrow plough, 1 set tine harrows, 1 set chain harrows, 1 set tripod harrows, 1 set disc harrows, 1 scarifier, 1 11-coulter drill, 1 top-dresser, 1 boom hay stacker, 1 two-horse tine sweep, and 1 tumbler sweep.

Traction power is provided by three medium draught horses. There is also a hack for the handling of stock.

Labour

With the exception of the harvesting period, and on a few odd occasions throughout the year, Mr. Martin does all of the work without assistance. This is the reason he does not milk more than 36 cows, for to do so would involve the employment of permanent labour and a reduction in the number of sheep carried, and this is not considered to be a payable proposition.

Conclusion

The success of this Rotorua dairy farmer has shown in some small degree the possibilities in the pumice country of the Rotorua district as a farming proposition. The property selected for description was chosen not because it was something really outstanding — Mr. Martin himself would be the last person to make such a claim—but because it is a good typical example of a one-man farm, and what it can be made to yield under common-sense management. In the ordinary course of events relatively large acreages of pumice country are definitely not required to sustain one man and his family as so many people today are prone to imagine. What is wanted is **management** and not merely "broad acres" wherewith to pander to man's ego and thereby actually encourage mismanagement. When this fact is finally recognised it is a safe prediction that the future demands for a life on the land will not only be easily met, but will result in a better living for the individual and a more prosperous national economy.

"Be thorough" is Mr. Martin's motto, and who will argue that it is not an excellent one when in the brief span of ten years he can square up the whole of his indebtedness besides maintaining himself, wife, and family as well.

Acknowledgment

Thanks are expressed to Dr. L. I. Grange for the map of Rotorua County on page 9. The map on page 10 is reprinted from "Agricultural Organization in New Zealand" (Belshaw, Williams, Stephens, eds.), published by the Melbourne University Press, to whom full acknowledgment is made.

Pig Industry Broadcasts.

UNDER the auspices of District Pig Councils broadcasts will be delivered in August as follows:—

Auckland—1YA, August 17, at 7.15 p.m., "Care of Young Pigs after Weaning," by Colin Wallace, Supervisor, Waikato District Pig Council.

Dunedin—4YA, August 14, at 7.15 p.m., "Litter Production," by M. Roderique, Supervisor, Otago District Pig Council.

Palmerston North—2ZA, August 15, at 8.30 p.m., "Care of Pigs After Weaning," by L. Marsdon, Supervisor, Wellington District Pig Council.

Napier—2YH, August 10, at 7.30 p.m., "Crops to Grow for Pigs," by Ivan Owtram, Supervisor, Tairawhiti District Pig Council.

The weight of a cubic foot of roots in a clamp or pit is as follows:—Turnips, 33 lb.; swedes, 34 lb.; mangolds, 35 lb.; carrots, 31 lb.; parsnips, 31 lb.; potatoes, 42 lb.

One cord of firewood measures 128 cub. ft. and is generally placed in a stack 8 ft. long by 4 ft. wide by 4 ft. high.

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HARNESS REPAIRS

Above, display of tools:—*From left:* Straight knife; round knife; punches, oval (3); punch, tongue; awl, stitching; awl, stuffing; edge tools (2); pincers; claw tool; compass; collar palm; hammer; plough gauge. *In front:* Saddle stuffer; ponky.

ALTHOUGH the repairing of harness is commonly considered to be within the province of the saddler, and consequently is neglected by the farmer, there is no reason why the latter should not undertake many of his own repairs. Those required are often very simple, and the following details are given, so that those who are not in a position to obtain training may be able, by studying them carefully, to acquire a knowledge of the work. It is necessary to bear in mind that, although the process may appear complicated, it is not really so, and can easily be mastered. Time is always available for doing odd jobs, and by following the instructions no difficulty will be encountered in making ordinary repairs, and the harness will be kept in good order at little expense.

It is not proposed to deal with the more complicated work, such as the restuffing of collars, etc.—this must be left to the trained man—but merely to show how many simple repairs can be neatly and strongly made.

The following list comprises a fairly complete outfit for effecting repairs. Whilst with these almost any class of work can be done, the possession of them all is not essential; for instance, much useful work can be accomplished with an awl, needle, and thread:—1 pair clams; 1 pair pliers, No. 3; 1 dozen awls, assorted; 1 dozen awl-handles; 1 dozen collar needles, assorted; 2 packets needles, Nos. 2 and 4; 1 saddler's compass; 1 round knife; 1 hand knife; 1 saddler's hammer; 1 edge tool, No. 2; 2 tongue punches, Nos. 35 and 37; 4 round punches, Nos. 3, 4, 5, and 6; 1 fine saddler's shoulder-crease; 1 single hand-crease; 1 saddler's palm. A saddler's plough facilitates the cutting of leather, but is not essential.

The different materials required in renovating harness are:—Pitch, resin, beeswax, black wax, best brown hemp (No. 2), tacks, bridle leather, harness leather, collar-check, brown serge.

A small leather apron, about 12in. by 4in., is required. This is suspended from the waist and hangs over the right thigh. A small S hook, for holding the hemp whilst making the thread, is also needed.

Use of the Tools

The Plough is somewhat expensive, and its work can be done by other tools, such as the round knife. The chief parts are a cutting blade and gauge. By setting it to the right width a strip of leather can be rapidly and accurately cut (Fig. 1).

The Round Knife is almost indispensable. It is the most suitable tool for shaving or bevelling leather, and is also used for cutting leather into straps or any other form. The line of cutting is marked with the compasses, and the round knife entered and steadily pushed forward along the line, keeping the left hand in front to hold the leather firm. The cutting is done on wood in the direction of the grain, and the surface must be free from nails (Fig. 2).

Fig. 1.—The plough.

Fig. 2.—The round knife.

Compasses are required for marking the lines for cutting, and for marking distances.

The Edge Tool is used for taking the sharp edges off the leather after it has been cut. If these edges are left, the leather readily frays or cracks. The tool is run along the edge with the right hand, and the work steadied by keeping the left hand in front (Fig. 3).

Punches are used for making the different holes required in leather working. The round form is used for making the holes in straps for receiving the tongue of the buckle. The tongue punches are used for cutting the hole for the heel of the tongue.

The Creases are used for making ornamental lines on the leather (Fig. 4). These lines do not increase the strength of the leather, but add much to its appearance. The crease is heated over a candle, and after wiping off

Fig. 3.—The edge tool.

the candle-black the crease is pushed along the leather until a sufficiently marked depression is made.

Awls and Awl-handles.—The awl-blades are attached to the handles by first pushing the heel of the blade into the handle as far as possible with the hand. The handle and blade are carefully examined to see that they are fitted truly, and then the blade is securely held in the vice, while the handle is driven down on to it with a light hammer.

Three kinds of awls are used:—

1. A curved awl, slightly flattened at the point, but otherwise round. This is used when the work cannot be stitched right through, but from one side only.
2. A round, straight awl, tapering gradually from the handle to the point. This makes a round hole, the size of which depends upon the distance the awl is pushed through. It is used where single holes are required, and in beginning and ending long stitching.
3. A diamond awl, used in ordinary stitching. Several of these are required to suit the different-sized threads used.

Confidence is the chief requirement in handling the tools, and a little practice soon makes the learner familiar with their use.

The Thread

A good thread is the first essential in making strong, lasting repairs. Good hemp must be selected, and considerable care exercised in the making. For convenience the hemp is kept in a small tin, with the end passed through a hole in the lid. The end is caught between the second and third fingers of the left hand, passed round the S hook, which should be about 3ft. away, and brought back and caught by the thumb and first finger of the same hand. Break the hemp by gently pulling with the left hand, while unravelling by rolling it downwards

Fig. 4.—The crease.

and away on the apron with the right hand. The breaking must be carefully done to obtain a fine, tapering point.

This process of passing the hemp round the hook is repeated until sufficient strands are brought together to give a thread of the required strength. This is determined by the class of work to be done. In light work two strands are used, while five or six are usually required for heavy stitching.

When sufficient strands have been brought together the end is taken between the thumb and first finger of the left hand, and the thread twisted by rolling with the right hand on the

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apron. The twist is kept in by catching the thread up by the finger and thumb of the left hand. The amount of twist determines its fineness, strength, and evenness. When well twisted wax freely, but quickly, by rubbing the wax briskly up and down right to the tips. A little more wax is applied to the tips than to the remainder, so that the needle can be more easily and securely attached.

It must be remembered that the threads are not doubled before twisting. A fine, tapering tip is required at each end for the attachment of the needle, and this can be obtained only by twisting the thread from end to end without doubling.

Wax

Wax is applied to retain the twist, to give strength and smoothness, and to preserve the thread. Two kinds are used, beeswax where black threads are not desirable, and cobbler's-wax.

The latter is most suitable for heavy stitching, and is composed of—

1lb. pitch, 4oz. resin.

The pitch and resin are heated until thoroughly liquefied and intermingled, when the composition is poured into cold water, in which it can be conveniently preserved. When required for use a piece about as big as the top of the thumb is cut off with a wet knife and held whilst being used in a piece of soft leather to prevent it sticking to the fingers.

These proportions of pitch and resin make a suitable wax for use in warm weather, but in winter it becomes hard and brittle. This can be overcome by making a mixture of—

1lb. pitch, 3oz. resin, 3oz. mutton fat.

The thread sometimes becomes hard or sticky when cold, and will not run well. This can be remedied by smearing the fingers with raw beef or mutton fat, and passing them up and down the thread a few times.

Threading the Needle

In saddlers' work stitching is not done with a needle and thread such as is used in stitching cloth. A single thread is used, and a needle attached to each end. The needles must be threaded securely, and in such a way that the thread, where it leaves the eye, is not thicker than the needle. If it is larger, either the thread or the needle will be broken in stitching.

To thread the needle pass about 1½ to 2in. of the tip through the eye (see A, Fig. 5); pass the needle through the thread (B); draw the thread through as far as it will go, and twist the loose end well round the thread; draw the needle through the thread two or three times (C) at a place near to the point where the end of the tip has reached, but between that point and the eye of the needle. By drawing the needle and thread through itself in this way the tip is woven to the thread and kept from unravelling. The finished thread, after smoothing down with the finger and thumb, is shown at D.

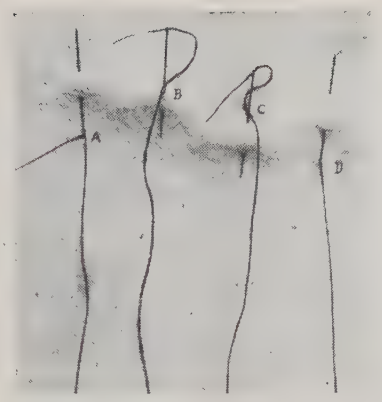

Fig. 5.—Threading the needle.

Requirements of Good Stitching

To obtain good stitching it is necessary that—

1. Thread of a kind and strength suited to the nature of the work be selected.
2. The thread be smooth, well twisted, and well waxed.
3. The stitches be all drawn equally tight, and made as firm as possible without cutting the leather.
4. The needles be used in the right way.
5. The right kind of awls be selected and correctly used.
6. The stitches be made towards the operator.
7. The work be closely and firmly held in the clams.
8. The stitches be of equal length.
9. The holes be of equal size and angle.

Preparing for Stitching

When neat work is required wheel-prickers are used to mark the line of stitching. These can be fitted with wheels to mark for any number of stitches per inch. The points on the wheel cut into the leather and make a distinct mark where the holes are to be made with the awl (Fig. 6).

It is necessary to have the work securely fastened so that it will not move whilst being stitched. Cut tacks are used for this purpose, and are drawn when the work is finished.

The sharp edges of the leather must be removed. This is done with the edge tool. Edge tools are made in various sizes to suit the class of leather.

The ends of the leather must frequently be bevelled before stitching, to obtain an even thickness and smooth surface, as, for instance, in stitching on a buckle. This is done by shaving the ends down with a round knife (Fig. 7).

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Fig. 6.—Lines for stitching marked by wheel-prickers.

Stitching

The work, whilst being stitched, is held by the clams. These are held between the knees, and are kept in position by resting the end on the floor, passing the clams under the right leg, and resting them on the left. By their use the hands are left free for stitching. The operator must sit with his thighs horizontal, or the clams will tend to slip away.

The awl is pushed through the leather from the upper side at a slight angle. This, besides preventing the holes tearing into each other, allows the thread to be drawn tighter. To facilitate the use of the awl saddlers usually cut a flat place on the handle, and by always keeping the thumb on this the right angle is secured without difficulty (Fig. 8).

When the first hole has been made the needle is passed up from below, and the thread drawn through until an equal length is on each side. The next hole is then made with the awl and the lower needle brought upwards through this, and when the thread has been drawn through about 3in. the upper needle is passed downwards through the same hole (see Fig. 9). The awl makes a diamond-shaped hole, and the thread brought up from below must be kept in the angle nearest

Fig. 7.—Shaving ends with the round knife.

the stitching already done—the lower end—while the thread taken downwards must be kept in the upper angle. This can be done by pulling downwards a little with the upper hand, while the lower hand is drawn slightly towards the operator. Each thread must be firmly drawn when pulled through (Fig. 10).

This is continued until the required amount of stitching has been done, when the thread is secured by turning back a stitch, using a round awl for making the hole. The thread when passed through is cut off flush with the surface of the leather.

Fig. 8.—Using the awl.

By following the above directions much useful repairing may be done by the farmer in his spare hours, and, besides being profitable, the work will be found interesting.

Broken winkers can be repaired, lost buckles replaced, and backbands and belly-bands which are damaged made strong again. Traces can be made safe, and the unsightly, dangerous knots, often seen in reins and other parts of the harness, replaced by strong, neatly-stitched repairs. It will be found that neat, strong work can be easily done, and that the details are soon mastered. Much of the work is merely cutting-out and stitching, and by close examination of the harness and imitation of it, nearly all repairs can be accomplished. Many articles, such as bridles, straps, belly-bands, etc., can also be made without difficulty. These can be cheaply bought, but provided good leather and hemp are obtained the home-made article will probably have the merit of greater strength and durability.

Fig. 9.—Stitching.

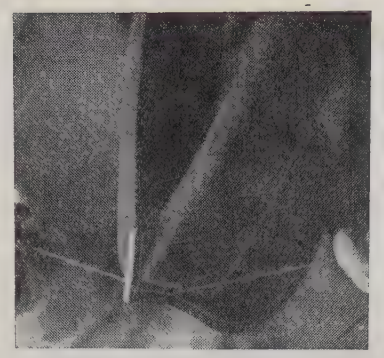

Fig. 10.—Drawing threads firmly.

Horse Rugs

Some difficulty is often experienced in securing a rug to the horse so that it fits him comfortably without slipping off. The best method of accomplishing this is to attach flank straps, instead of the crupper that is often used, and to have the usual girth and chest straps. When flank straps are adopted it is not necessary to buckle any of the straps as tightly as when a crupper is used.

Although rugs can be bought cheaply, they are often home-made, and the following instructions will be useful:—The rug consists of a canvas covering and an inside lining of some warm material such as serge. For ordinary horses the covering is made 6ft. square, and when the strips of canvas have been stitched together a curved piece is cut out over the withers. This piece is cut out 10in. deep in the centre and is 4ft. wide at the base.

The edges of the canvas are doubled up twice to give a good, firm hem about half an inch wide. The inside lining is 4ft. wide, leaving 1ft. on each side of the canvas covering unlined.

The buckles for the flank straps are put just in front of the back hem, 1ft. in from the edges on the outside, and the straps taken through a slit near the hem of the canvas. A "D" is stitched on the inside of the rug about 20in. forward from the back hem, and 1ft. in from the side, for the attachment of the flank straps by clips. The straps are made about 5ft. long so that they can be adjusted to the size of the horse. The girth, which is 2ft. 6in. long, is stitched on the inside, 22in. back from the front hem, and 1ft. in from the side.

The girth strap is 18in. long, and is attached in the same relative position as the girth on the opposite side. The chest strap and buckle are placed on the front hem on the outside, 1ft. from the side. To make the rug stronger a strip of leather about 2½in. wide may be stitched down the centre on the outside.

In attaching all buckles and straps care should be taken to have them stitched on to the inside lining as well as the canvas covering, and not placed where the stitches will pass through the canvas only.

Fig. 11 illustrates a horse-rug and the positions of the buckles and straps.

Acknowledgment

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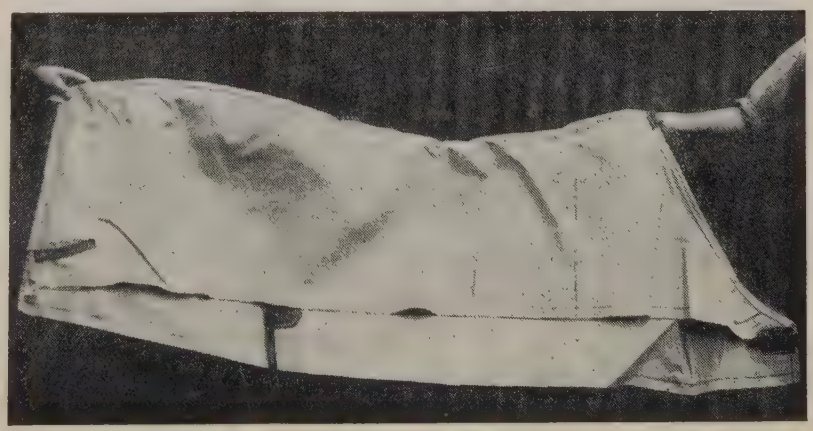

Fig. 11.—Horse rug showing positions of straps and buckles.

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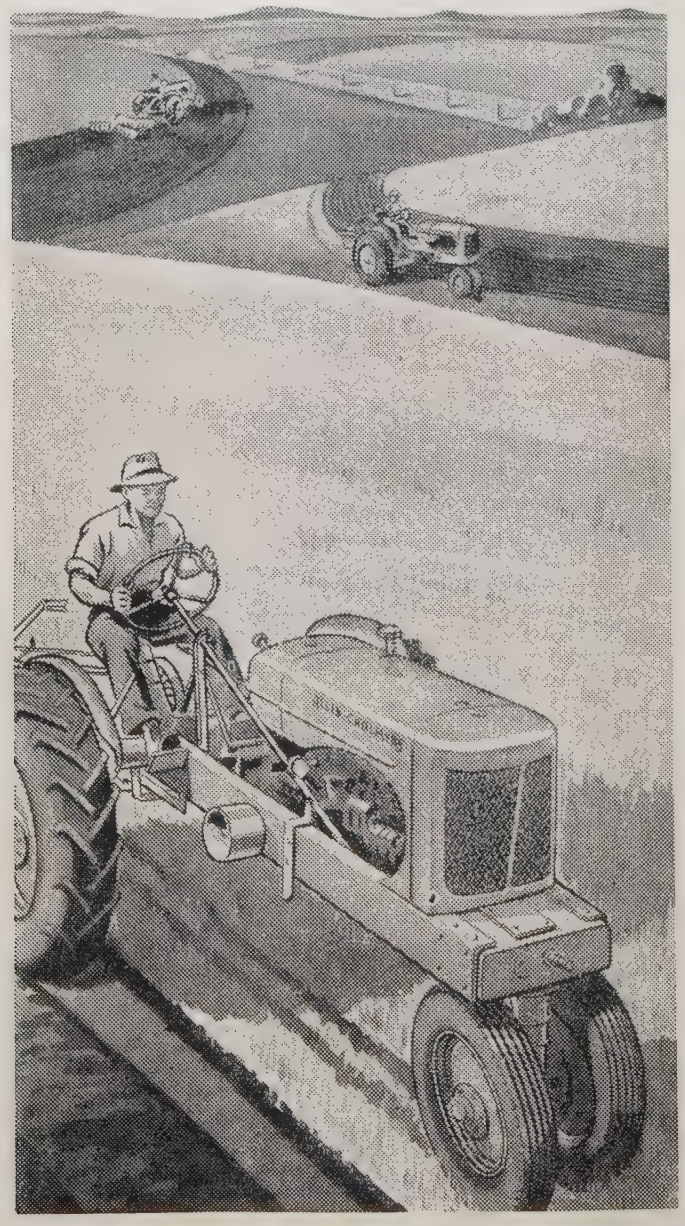

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PEA GROWING

Crops in Marlborough

Above: Header-harvesting garden peas.

From the Rai Valley in the north to the lowest part of the Ward district pea growing has been carried out and areas are now being grown in the Kaikoura district also. It can be safely said that over the whole of Marlborough's arable land the pea crop is to be found in abundance. To the visitor the sight of thousands of acres of garden peas is a novel one, and with about 10,000 acres sown to peas this season Marlborough's pea industry is certainly flourishing and adding a valuable contribution to New Zealand's war effort.

— By —

D. R. WILKIE,
Instructor in Agriculture,
Blenheim

ALTHOUGH the war has brought an added demand for this crop, pea growing in Marlborough is an enterprise of long standing and owes its inception to the initiative of firms and individuals who foresaw its possibilities many years ago, and its maintenance to the fact that while it gives a fair return to the producer it is a legume and consequently is of assistance in improving the soil for succeeding crops.

Preparing Seed-bed

It is the general rule for peas to be sown out of grass and it has been found that autumn ploughing out of lea gives the best results. All succeeding cultivation prior to sowing has a definite aim in view: that is, to prepare a seed-bed which is fairly firm, but reasonably cloddy on top. This is practised because of two factors inimical to good germination; firstly, soil which is too fine will run together, thus hampering the seedlings in their early stages, and, secondly, deep drilling which may result from looseness of the soil does not give the best results.

Sowing takes place from the middle of August up till the end of November, depending on the state of the season, and the type of land involved and the variety. The crop is invariably drilled in with ¾ cwt. of superphosphate per acre, 3 bushels to 4 bushels per acre of seed being sown. All being well a strike should be apparent in about 10 days. The earliness of the strike depends of course on the conditions and the variety sown.

Seed Varieties

The variety used is constantly changing, depending on the demand from overseas. However, varieties of field peas are Blue Prussian, which is grown extensively, and Mammoth Blue, introduced last season and covering only a few areas in comparison. Among the garden varieties early types are William Massey, English Wonder, and Witham Wonder, while two popular main-crop varieties are Onward and Greenfeast. None of these varieties is static, and stock lines are constantly being renewed or replaced as the market alters.

Apart from the manure sown with the seed no further fertiliser is added, but when the peas are 3 in. to 4 in. high weed control becomes necessary and other matters have to be corrected. Peas are a crop which can be smothered by weeds if left unattended, and they dislike, as most crops do, a hard cake on the soil surface during the early periods of growth. It is on account of these facts that harrowing of the young peas is undertaken. To the new grower this appears an extreme practice and he regards the tender young shoots with trepidation and his harrows with distaste. He has to learn the old pea-growers' maxim, however, "Go for your life and don't look back." Quite a number of peas are pulled out and others damaged, but experience has shown that the practice is well worthwhile. Special light pea harrows are available for the job. Rolling of young peas to crack any crust and consolidate the soil round the root is sometimes practised, but this is not a general rule and is usually done only when the paddock has not been firmed enough in the first instance.

After harrowing not a great deal of attention is necessary on the farmer's part, but consistent soil moisture and suitable showers, particularly at flowering and podding time, are essential and can make all the difference between a good crop and a mediocre one.

Harvesting

The last few days of December see the first of the pea crop ripening off and the call is for pick-up headers at the right time in the right place, so that, weather permitting, the crop may be harvested in good condition with the least possible labour. Most crops are cut with a mower, and allowed to dry out for a period of 10 days and then picked up and threshed with a header harvester, the sacks being left in the paddock ready for transport to store. Under favourable conditions on the lighter country direct

heading, that is, picking up the uncut crop, is undertaken, but as this entails leaving the crop until dead ripe in the paddock it is confined to the drier land where even ripening takes place. This method applies mainly to field peas.

Header harvesting the crop is in marked contrast to the procedure adopted a few years ago when most peas were cut, swept into cocks, stacked, and then threshed out of stack. Principally for the saving in labour the newer methods involving the use of headers have been adopted extensively, and while they give good results under favourable conditions one does well in considering the matter to remember the unwelcome shower which arrives when the header is ready and waiting and the consequent turning of the crop to assist drying; the persistent light southerly winds which make the straw tough and difficult to thresh properly, and the heavy winds which can toss a pea crop around with much resultant damage.

Where the Crop Goes

The uses to which this crop is put are many and varied. While a small proportion is retained in New Zealand for distribution as packet peas, export to Australia and England is carried on, the amount going to England for this purpose being easily the larger. Other uses are for canning, splitting for soups, sausage filling, and pea meals, the field varieties being used for these purposes.

How to work out amount of butterfat supplied to factory from details on cream slip: The cream slip returned by the factory each day, and a copy of which is sent on a 10-day period sheet, gives details of the net weight of cream supplied and the grade. On the 10-day sheet the average test for that 10-day period is given at the bottom. By totalling up the amount of cream for each day, say you get a total of 1954 lb. for the 10-day period, with an average test of 38. This means that 100 lb. of cream contains 38 lb. of butterfat. Thus the total amount of butterfat supplied for the period

$$= \frac{38 \times 1954}{100} = 742.5 \text{ lb.}$$

This is a handy table for the conversion of water measurements:—

Cub. ft. to lb.	Multiply by	62.270
Lb. to cub. ft.	„	.016
Cub. ft. to gals	„	6.200
Gals. to cub. ft.	„	.160
Gals. to lb.	„	10.000
Lb. to gals.	„	.100
Gals. to litres	„	4.500
Litres to gals.	„	.220
Head of water (ft.) to lb./sq. in.	„	.430

Mr Dairyfarmer

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Serpentine Superphosphate

Results From Field Experiments

PRELIMINARY results and recommendations for the use of serpentine superphosphate were published in the September, 1941, issue of the Journal. Since then this fertiliser has been used on an additional number of annual crops and pastures and more information is now available regarding results secured on a wide range of soil types and climatic and farming conditions.

— By —
A. G. ELLIOTT,
Crop Experimentalist,
Wellington.

THE following trials with serpentine superphosphate have been laid down since 1939 and results are summarised under the following headings:

1. Pasture topdressing trials:—
   (a) Mowing trials 3
   (b) Observational trials .. 173
   (c) Half-paddock trials .. 9
2. Trials with annual crops:—
   (a) Wheat manurial trials .. 27
   (b) Potato manurial trials .. 20
   (c) Brassica manurial trials .. 55

   Total 287

1. PASTURE TOP-DRESSING TRIALS.

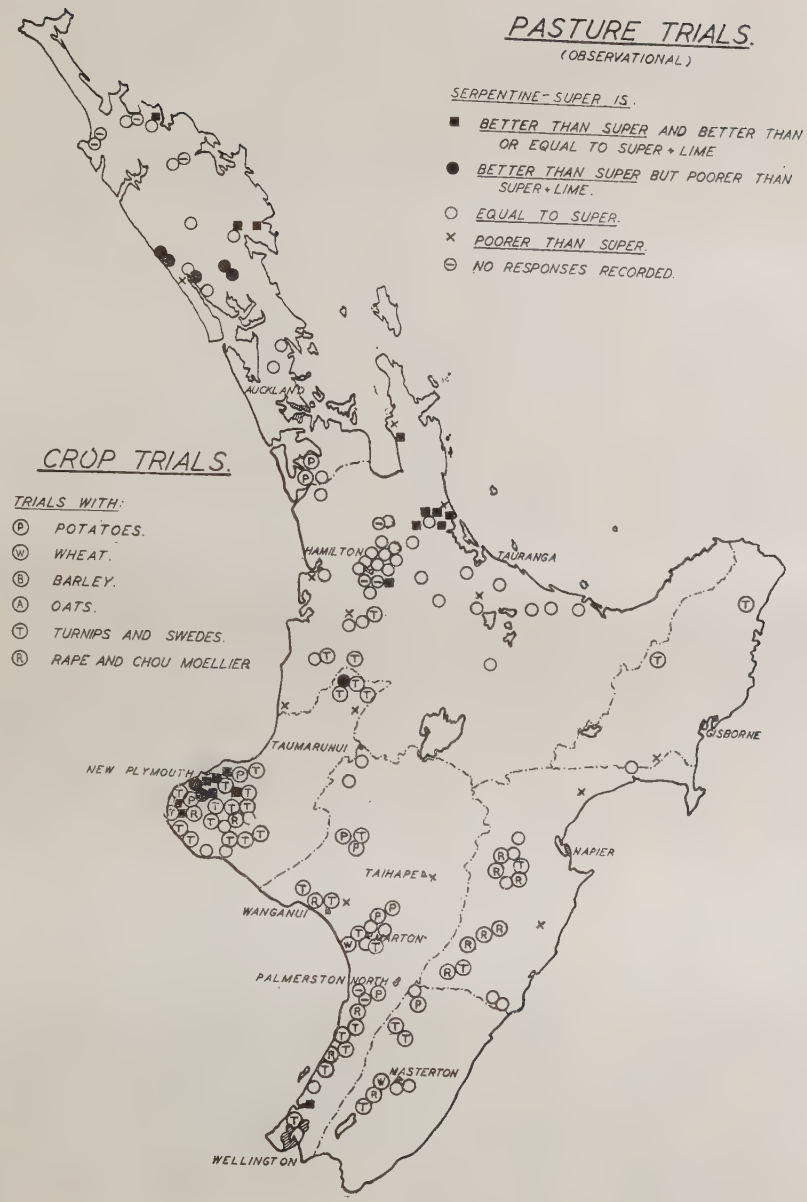
(a) Mowing Trials: These three trials, in which superphosphate and serpentine superphosphate are each applied at the rate of 4 cwt. per acre annually, are in progress on the Marton Experimental Area and detailed results from the last summary prepared on February 2, 1944 (Trial P), and January 31, 1944 (Trials R and S), are given in table 1:—

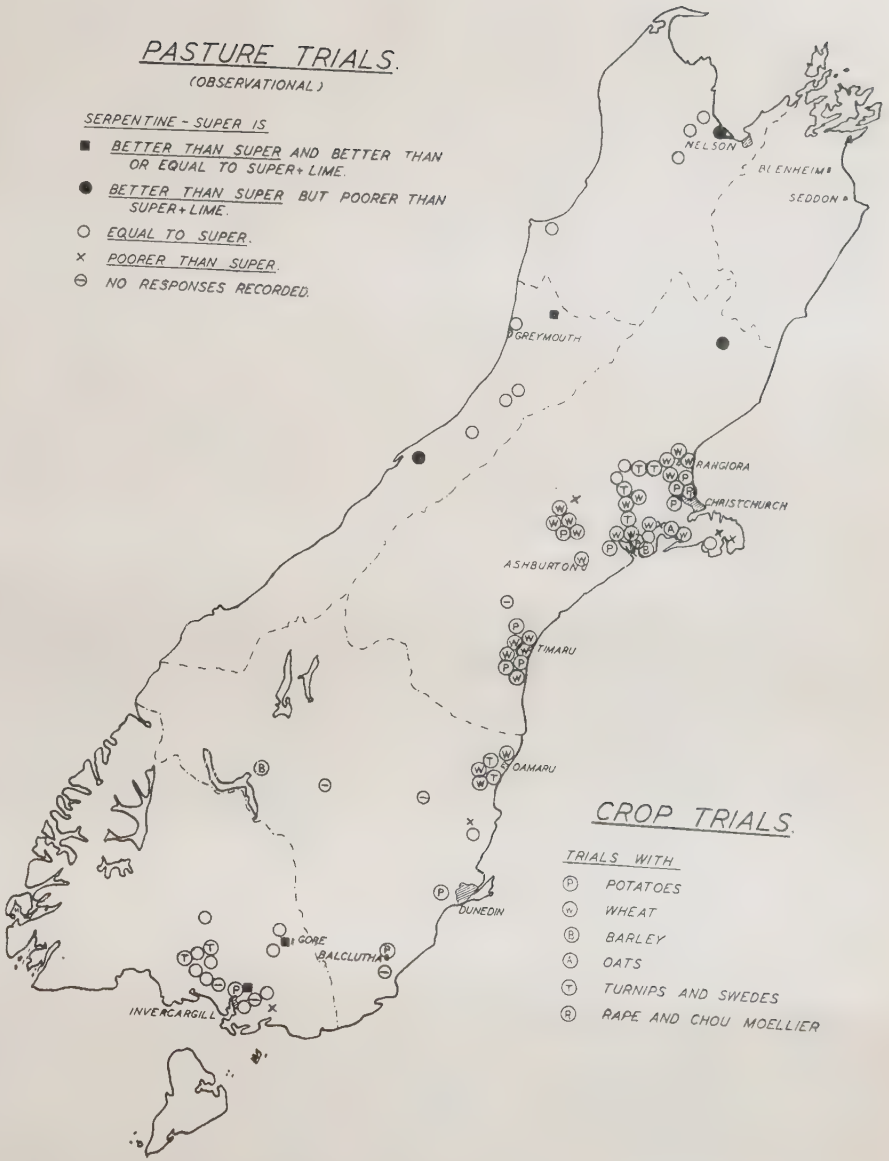
The phosphate up-take determined by analyses of pasture samples from Trial S during the period June 16, 1942, to March 9, 1943, was greater on herbage from serpentine superphosphate than from superphosphate treatments.

(b) Observational Trials: The maps accompanying this article show the location and responses noted by instructors and co-operating farmers on 173 trials throughout the Dominion on which serpentine superphosphate applied at the rate of 3 cwt. per acre is compared with superphosphate used at the same rate. The information shown on the maps is summarised as follows:

1. Serpentine super better than super and better than or equal to superphosphate plus lime: **21 trials** (Auckland 10, Wellington 8, Christchurch 1, Dunedin 2).
2. Serpentine super better than superphosphate but poorer than superphosphate plus lime: **11 trials** (Auckland 6, Wellington 2, Christchurch 3).
3. Serpentine super equal to superphosphate: **75 trials** (Auckland 39, Wellington 14, Christchurch 12, Dunedin 10).
4. Serpentine super poorer than superphosphate: **19 trials** (Auckland 8, Wellington 5, Christchurch 4, Dunedin 2).
5. No responses recorded: **15 trials** (Auckland 7, Wellington 2, Christchurch 1, Dunedin 5).
6. Insufficient reports: 32 trials (Auckland 16, Wellington 10, Christchurch 1, Dunedin 5).

From the above it is seen that out of 173 trials serpentine superphosphate has been better than or equal to superphosphate in 107 and poorer than the latter in 19 trials. No responses were recorded on 4 trials in North Auckland on low-fertility soils with a high lime requirement, on 3 trials in the Waikato, and on 2 trials in the Manawatu on intensively-farmed and highly-topdressed grassland. The 15 trials in class 5 above are not included in the totals in this paragraph. Where less than 6 reports have been received on any trial it is not included and this accounts for the 32 trials listed above, most of which have been only recently laid down.


PASTURE TRIALS.
(OBSERVATIONAL)
SERPENTINE - SUPER IS.
■ BETTER THAN SUPER AND BETTER THAN OR EQUAL TO SUPER + LIME
● BETTER THAN SUPER BUT POORER THAN SUPER + LIME.
○ EQUAL TO SUPER.
× POORER THAN SUPER.
⊖ NO RESPONSES RECORDED.
CROP TRIALS.
TRIALS WITH:
(P) POTATOES.
(W) WHEAT.
(B) BARLEY.
(A) OATS.
(T) TURNIPS AND SWEDES.
(R) RAPE AND CHOU MOELLIER
AUCKLAND
HAMILTON
TAURANGA
GISBORNE
TAUMARUNUI
NEW PLYMOUTH
NAPIER
TAIHAPE
WANGANUI
PALMERSTON NORTH
MASTERTON
WELLINGTON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○ EQUAL TO SUPER.
× POORER THAN SUPER.
⊖ NO RESPONSES RECORDED.
NELSON
BLENHEIM
SEDDON
GREYMOUTH
RANGIORA
CHRISTCHURCH
ASHBURTON
TIMARU
OAMARU
DUNEDIN
GORE
BALCLUTHA
INVERCARGILL
CROP TRIALS.
TRIALS WITH
(P) POTATOES
(W) WHEAT
(B) BARLEY
(A) OATS
(T) TURNIPS AND SWEDES
(R) RAPE AND CHOU MOELLIER

(c) Half-paddock Trials: Observations, supported in some cases by stock-carrying figures, show that serpentine superphosphate has given better results than superphosphate plus lime at Ruatangata, Onerahi, Waihi, Kent Road (New Plymouth), Warea, and Pahautanui. The new fertiliser has been equally as good as superphosphate plus lime on trials at Raglan, Kennington (Southland), and Winton. In all cases the phosphates were applied at the same rate per acre.

2. TRIALS WITH ANNUAL CROPS.

(a) Wheat Manurial Trials: During the last four years trials have been carried out comparing serpentine superphosphate and superphosphate each sown at the rate of 1 cwt. per acre in farmers' crops in the principal wheat-growing districts extending from Rangiora to North Otago. Results are tabulated in table 2:—

(b) Potato Manurial Trials: Yields in tons per acre from 20 trials laid down in the main potato-growing districts from the Manawatu to Southland are shown in table 3:—

(c) Brassica Manurial Trials: Germination counts to compare the effect of sowing serpentine superphosphate and both "straight" and proprietary mixtures with the seed of these crops and also yield figures were secured from 55 trials laid down in a number of districts throughout the Dominion. In all cases the new fertiliser gave results equally as good or was better than the others in the trial.

In a pot experiment at Ruakura where turnips were used as indicator plants serpentine superphosphate was better than superphosphate and second only to a specially prepared di-calcic phosphate.

Results Summarised

In all replicated trials where yield figures were secured the results from applications of serpentine superphosphate did not differ significantly from those secured from other phosphatic fertilisers applied at the same rate per acre. Where observations only were available applications of the new fertiliser gave results equally as good as or was better than superphosphate or superphosphate plus lime in 107 out of 173 trials covering a wide range of soil, climatic, and farming conditions. Serpentine superphosphate gave better results than superphosphate plus lime in 6 half-paddock trials and was equal with the latter in 3 trials out of 9 carried out by this method. Trials of all types are established on farms under normal management and consequently the results detailed above are such as can be expected by farmer users under the conditions obtaining during the period under review.

All results from both field trials and laboratory tests were critically examined recently at a conference of technical and field officers engaged in this investigation and their findings, published in the March, 1944, issue of the Journal, are repeated below:—

1. **That in general serpentine superphosphate is at least equal to superphosphate as a fertiliser for annual crops and topdressing grassland.**
2. **That on lime-responsive soils lime is just as necessary with the use of serpentine superphosphate as it is with superphosphate.**
3. **That there will always be an important place for serpentine superphosphate in New Zealand fertiliser practice.**

In addition to the evidence secured from the official trials described above it is of interest to know that farmer users have recently commented on favourable results obtained from serpentine superphosphate and no doubt as more information becomes available the new fertiliser will occupy the place in New Zealand agriculture for which those concerned in the investigations consider it eminently suitable.

TABLE 1.—MOWING TRIALS.

Trial Commenced.		Production Dry Matter—lb. per Acre. Super.	Production Dry Matter—lb. per Acre. Serp.-Super.	Relative Yield. Super.	Relative Yield. Serp.-Super.
P	27/6/39	45,886	45,672	100	99.5
R	6/5/40	40,184	39,631	100	98.6
S	12/3/40	38,232	39,377	100	103.0

TABLE 2.—WHEAT MANURIAL TRIALS.

Season.	Number of Trials.	Average Yield in Bushels per Acre. Superphosphate.	Average Yield in Bushels per Acre. Serpentine Superphosphate.
1940-41	.. 7	37.4	37.2
1941-42	.. 6	45.1	45.4
1942-43	.. 10	36.3	36.0
1943-44	.. 4	38.7	37.7

TABLE 3.—POTATO MANURIAL TRIALS.

Fertiliser:	1940/41. (8 trials)	1941/42. (6 trials)	1942/43. (6 trials)
Super 2cwt. per acre	—	8.7	—
Serp. super 2cwt. per acre	—	7.9	—
Super 3 „ „ „	8.9	—	—
Serp. super 3 „ „ „	9.0	—	—
Super 4 „ „ „	—	10.9	—
Serp. super 4 „ „ „	—	10.4	—
Super 6 „ „ „	10.0	—	—
Serp. super 6 „ „ „	9.6	—	—
Serp. 2cwt. & S./Am. 1cwt. per acre	—	—	12.3
Serp. sup. 2cwt. & S./A. 1cwt. per ac.	—	—	12.3
Serp. 3cwt. & S./A. 1cwt. per acre	9.5	8.4	12.5
Serp. sup. 3cwt & S/A 1 cwt. per ac.	9.6	9.0	12.1
Average difference serp. super minus super	—0.1	—0.5	—0.2

Average difference for 20 trials—0.3 tons per acre. Differences generally are not significant.

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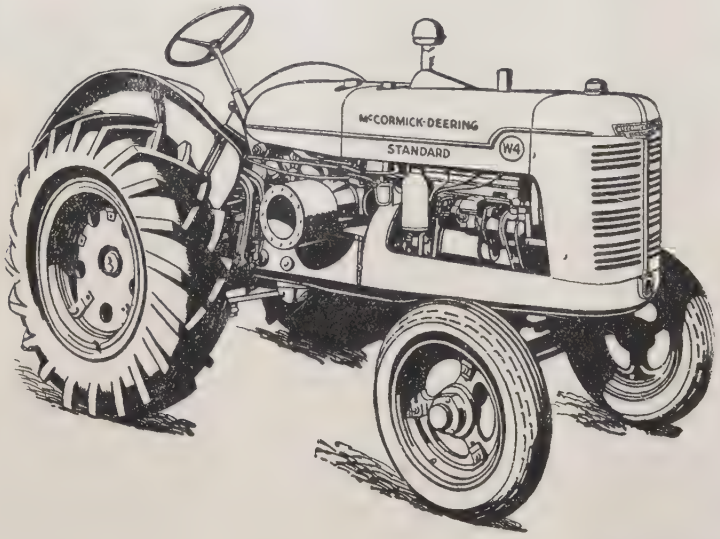

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Record Year of Seed Testing

Notes On Output At Palmerston North

— By —

N. R. FOY, Officer-in-Charge, Seed-testing Station, Palmerston North.

A RECORD year was experienced at the Department's Seed-testing Station at Palmerston North for the period January-December, 1943, a total of 23,964 samples being submitted for one or more of the tests provided as routine service. These operations required the working and recording of approximately 76,000 separate tests, which must easily be a record output per operator for any station. In this respect credit is due to the staff, which was fully extended for the greater part of the year; also to the seed trade for the patience shown during the difficult months, when the daily receipt of samples was well beyond the capacity of the station.

A FEATURE of the year's working was the receipt of 1500 samples of Certified Montgomery red clover, compared with 330 and 560 for 1941 and 1942 respectively, germination tests on which revealed an unusually high proportion of internal seed injury. With the advent of header harvesters embryo fracture in peas and blue lupins has become not uncommon, and with the increasing areas of Montgomery Red clover for seed production, plus the employment of header harvesters, the reduction of germination percentages by high proportion of "broken growths" has become a problem of first importance to seed grower and merchant.

"Broken Growths"

Broken growths, it should be explained, are abnormal seedlings produced by apparently normal seeds, the embryos of which have been partially or completely fractured, which injury renders the seedling incapable of emergence and establishment in soil. Through the high incidence of broken growths a considerable quantity of seed failed to reach the germination standard required for export, and it is to be hoped that growers will realise the necessity for constant supervision of header operations, and to ensure that drum settings are such that in relation to condition of the crop the seed is not being subjected to unreasonable and unnecessary pressure. A drum setting that will be satisfactory for morning operations when the crop is just out of the dew may be most unsuitable by mid-afternoon when the crop has dried out. External chipping of seed is caused by faulty drum adjustment and is responsible for the failure of many lines to conform to export standard of purity.

There has been some criticism of the methods of testing, whereby chipped seed is classified as inert matter and broken or abnormal seedlings are treated as being worthless, but it is pointed out that the method is as prescribed by the International Seed-Testing Association, and that British seed merchants have very decided views on the value of seed of this type. It is no doubt disappointing to growers and merchants to have attractive-looking seed classed as unexportable, but the remedy lies entirely, in so far as climatic conditions will permit, with the growers and header combine operators.

Ryegrass being germinated for ultra-violet light examination.

Ultra-violet Light Test

Analysis of the samples received and of the test percentages reveals a very considerable reduction in the number of samples of ryegrass of the inferior false perennial type, which leads one to the satisfactory conclusion that the widespread use of Certified perennial ryegrass in New Zealand, together with the unpopularity of the false perennial ryegrass overseas, has resulted in a close approach to the elimination of very inferior types from New Zealand markets.

The use of the ultra-violet light test for the purpose of certification of perennial ryegrass in the Permanent Pasture class has unquestionably assisted materially in hastening this process.

Tolerance

With 98 per cent. purity and 90 per cent. germination as the overseas buyers' minimum specification, the importance and value of attaining these figures is obvious, and the disappointment following receipt of 97.8 per cent. purity or 88 per cent. germination is readily appreciated. Outside of the trade it is not common knowledge that every test percentage has an allowable margin of error or tolerance. This means that owing to chance selection of varying proportions of the component parts of a sample, pure seed, weed seed, living seed, dead seed, and so on, results of several tests rarely agree precisely, but should do so within a calculated margin, plus or minus. Thus, repeated purity and germination tests on a sample could result in something like this, 98.0/90, 98.2/88, 97.9/91, without any one of them properly being regarded as incorrect. Some members of the trade have not been slow in taking advantage of this fact by resubmitting samples until chance favoured them with the desired higher result. While this procedure is by no means irregular, it is open to criticism, in that the buyer of a line quoted on a "high" result, slightly in excess of purchase specification, may have difficulty on resale in securing percentages on which his purchase was made.

Blending, too, provides difficulties in a similar respect, in that where the weighted average falls just above the required minimum the odds for and against the falling above or below the required percentage would be about equal, so that as a precautionary measure weighted averages should always show a significant margin in excess of the required figure. Some

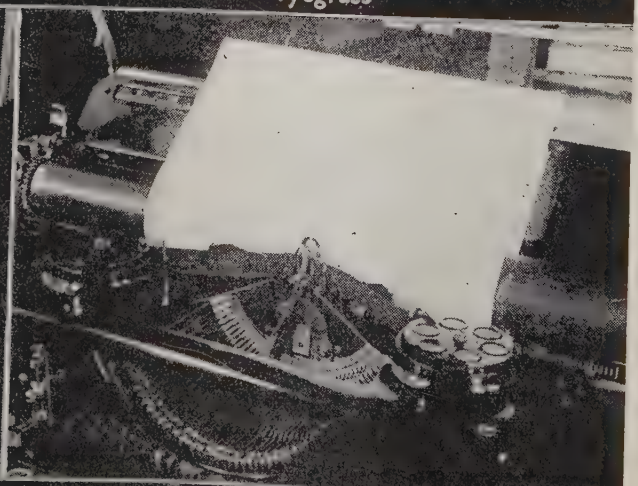
Main laboratory

Purity analysis

Strain testing ryegrass by ultra-violet light

Pre-harvest examination of perennial ryegrass

Strain testing white clover



Certificate of analysis

blends are even estimated to fall below the necessary percentage, in the hope that chance will favour with a "high" result, equal to or above that percentage—at best a somewhat sporting procedure open to criticism on the buyers' account.

Hard Seeds

Red and white clover in 1943 was notable for the high hard seed content of a great majority of samples, in which circumstances germination percentages were usually quoted "including hard seeds," rather than "plus hard seeds." In answer to the frequent enquiry, "Have hard seeds any value?" it can be said that owing to the varying degree of hardness exhibited by different species and within one species it is impossible by the use of a formula to estimate "value." Hard seeds soften with age, and then germinate normally, but as the softening period depends on the degree of hardness, irrespective of whether the seed is in the soil or in a bag, months or years may elapse before the seed-coat becomes permeable to moisture. It is the presence of hard seed in soil which gives rise to the expression that "white clover comes in naturally," which seed may have lain in the soil for many years.

Some seed-dressing plants reduce the proportion of hard seeds by mechanical scarification, but if this process be too severe, embryo injury can result in high percentages of broken growths. In answer to the frequent enquiry, "Why do certain plants produce some hard and some soft seeds?" the accepted theory is that it is a natural provision for the survival of the species through unfavourable conditions. Normally, a mature seed "rests" for a short period, and when the appropriate conditions of moisture and temperature are present germination establishes. Should unfavourable conditions or accident result in total destruction of the seedlings, there is no survival of the specimen. If, however, a proportion of the seeds produced are incapable of germination for months or even years, the one seed fall will provide a recurring seedling establishment over very long periods.

Dormancy

Although the "mechanics" of dormancy differ from those of hard seeds, the purpose is the same. Dormancy occurs in the seeds of many plants to a varying degree, but is agriculturally important in cereals, especially oats. The autumn trade in "old season's" Algerians is well known in most parts of New Zealand, and is due to the fact that the new season's seed is dormant and incapable of immediate germination, except under conditions of low temperature. In the laboratory here new season's oats are refrigerated before being germinated at room temperature. The condition is due to a complicated "locking up" of the ferments necessary to institute process of germination. Storage under normal temperatures for some months rectifies the condition, or, alternatively, low-temperature treatments. The effects of both time and temperature are interesting in that in either case there is a natural insurance against germination until late in the season, when a moisture supply is ensured.

In reporting the growth percentages for dormant oats both test results are stated—one at normal temperatures, say 10 per cent., and the other at low temperatures, say 95 per cent. With this information the holder of the line knows that the line is unsuitable for immediate sowing and that the potential growth after some months of storage is good.

Seed Deterioration

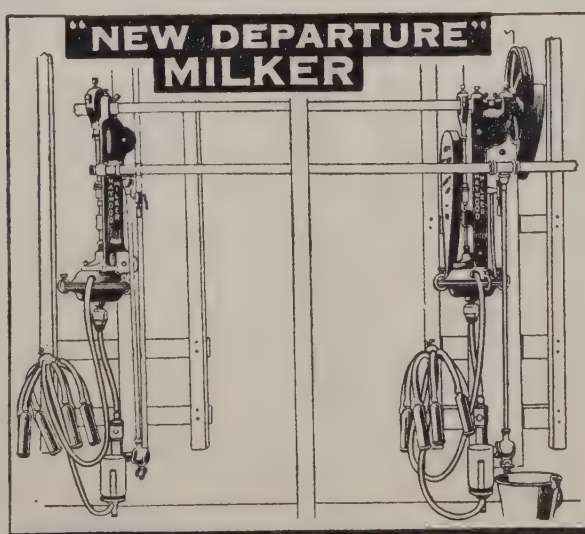
The period during which seed will retain its capacity to germinate varies widely with the different species. Taking grass and clover seeds of commerce, the period varies from 12 to 18 months for the fescues, up to several years for the ryegrasses. A seed consists simply of a living plant embryo, together with a supply of plant nutrient. Although embryo growth is suspended, the cell tissues are living, which condition necessitates the continuance of an extremely slow process of oxidation. If the seed is held in storage for a long period, the vital elements are gradually reduced by this process until the embryo can no longer survive, when the seed becomes incapable of germination. The process of germination is an extremely complicated one, and is actuated by a copious moisure supply plus oxygen from the air, so that it can be imagined that the presence of water actually speeds up oxidation to commence the chemical changes, which processes ultimately result in growth. Seed in normal storage conditions is surrounded by air, containing moisture in varying quantity, and although the quantity is relatively small, it is sufficient to slowly oxidise the "living" elements until, if the period of storage be sufficiently long, vitality becomes exhausted.

For this reason seed with a very high moisture content is conditioned by artificial drying to reduce the content to normal for safe storage. Air drying is used also to reduce the normal moisture content of sensitive short-lived seed to a limit below normal. Seed thus treated will retain vitality under conditions—especially of high temperature—which normally would cause it to deteriorate rapidly. Thus any seed should always be stored in a cool, air-dry store.

Longevity

The length of the life of seed depends on the kind of seed, the conditions under which it is stored and the degree of dormancy or suspension. Some commercial seeds commence to deteriorate in about 12 months, whereas many seeds remain viable in the soil for over 50 years.

No hard-and-fast rules can be laid down in respect of the duration of the life of seed under normal conditions of storage. Generally most grass and clover seeds can be carried over for three to four years, the exceptions being chewings fescue, timothy, crested dogstail, and a few others of lesser importance. Cocksfoot is more sensitive than the ryegrasses, which will store well up to six years.



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Much depends on the harvesting conditions of the seed and its subsequent treatment. Deterioration in white and red clovers is well marked by the presence of lustreless dark brown seeds.

INTERPRETATION OF TEST PERCENTAGES.

Apart from type, and to some extent bushel weight, the prime factors indicative of quality are purity and germination.

Purity is the percentage by weight of the kind of seed as labelled.

Germination is the percentage by **count** of the **pure** seed which will germinate under appropriate conditions.

Pure germinating seed is the percentage by **weight** of pure living seed of the kind labelled. This is the only percentage which may be used by itself to express value or quality for sowing purposes.

The three separations made in the course of the purity analysis are all expressed as percentages by weight.

Other crop seed: All species of crop seeds other than as labelled.

Weed seed: All seeds of plants commonly classed as weeds or not marketed as agricultural seed.

Inert matter: All material other than mature, whole seed—empty glumes, straw, earth, broken seed, etc.

The presence of all seed impurities is indicated by the botanical names of the species. This procedure is sometimes criticised, but as certificates of analysis pass into international commerce a universal usage in terms is essential. Common names are often of local adoption and are unknown elsewhere. For instance, what New Zealand farmer would recognise in the "stinking willie" of North America the common ragwort—known to all countries as *Senecio jacobaea*?

GERMINATION UNDER ARTIFICIAL CONDITIONS.

The opinion is often expressed, especially by owners of low germinating seed which they have for sale, that certain kinds or types of seed germinate better in soil than they do in a laboratory germinator. In support, the statement is made that there is "something in the soil" with a stimulating effect on those seeds which a seed laboratory unkindly classifies as dead. There is no evidence in support of this statement and quite a lot to the contrary. Laboratory germinator conditions approach as nearly as it is possible to the ideal in temperature, moisture, and air supply, the three factors which, with appropriate hygiene, are requisite to seed germination. The chances of the same conditions being provided in soil are most remote, and even when germination takes place the seedling has much to contend against before ultimate establishment.

Generally, under the most favourable field conditions, the proportion of plant establishment will be 10 per cent. to 15 per cent. lower than the germination capacity found under laboratory conditions. Under unfavourable conditions the difference may go up 30 per cent. or 50 per cent., which is the reason why fairly heavy sowings of high germinating seed are usually favoured.

Ability to recognise common pasture plants and a knowledge of their habitat requirements are of fundamental importance in the study of grassland improvement. Following the best traditions of pasture research "Grasses and Clovers in New Zealand" (Bulletin 210, Department of Agriculture) should be of great value to farmers, research workers, and students. It is available at 1/- per copy (post free) from offices of the Department of Agriculture.

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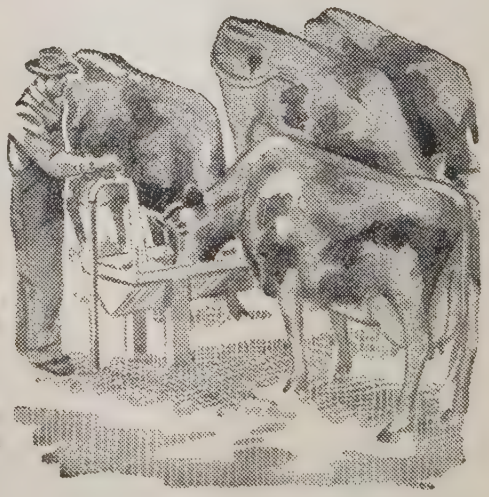
Successful farmers know the important part ample quantities of water play in milk production. Cows, supplied with all the drinking water they want, produce more milk. With more work to do on the farm and labour hard to get a Renown Pump and Automatic Pressure System is a necessity to-day.



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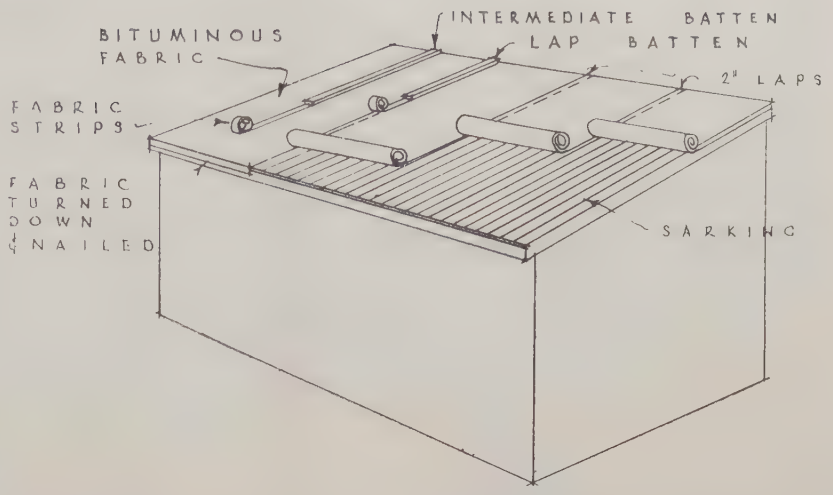
Roofing Materials for Farm Buildings

With the current drive for increased production, when many farmers are repairing existing farm buildings and contemplating new construction, numerous inquiries have been received by the Department concerning roofing materials, some types of which are in extremely short supply. In order that farmers may be aware of the position regarding roofing materials, the following statement has been prepared by the Building Controller:—



Galvanised Corrugated Iron

"GALVANISED corrugated iron has been in short supply in New Zealand since the outbreak of war, and it has been necessary to exercise various measures of control to ensure that any stocks of galvanised iron which became available should be used for the most essential purposes and in the most economical and effective manner. Galvanised iron is being reserved as far as possible for essential repairs to existing buildings. Providing shipping difficulties do not adversely affect the programmed deliveries of galvanised corrugated iron, it is anticipated that sufficient material will be available at least to satisfy the demand for essential repairs to dwellings and other major and permanent buildings. I cannot foresee, however, the overall situation improving to the extent that galvanised corrugated iron can be made available for new building purposes.

Roofing Tiles

"Clay or concrete roofing tiles are available in the majority of districts in New Zealand, and these should be used on all new residences and small commercial and public buildings where pitched roofs are being employed. If, owing to transport problems, it is not practicable to utilise roofing tiles on new constructional work, the alternative roofing materials, asbestos cement sheets and bituminous fabric, must be relied on.

Asbestos Cement Sheets

"The production of asbestos cement roofing sheets is nowhere near sufficient to satisfy the present demand, or to bridge the gap caused by the restrictions in the supply from overseas of galvanised corrugated sheets. Priorities have had to be established, therefore, in respect to the delivery of asbestos cement sheets, and preference is being given in the allocation of the material:—

1. **To certain defence and emergency hospital works of a relatively permanent nature;**
2. **To essential factory and warehouse buildings;**
3. **To the maintenance of existing buildings; this comprises principally the complete re-roofing of buildings on which iron had previously been employed, and on which it is not practicable to re-roof with roofing tiles or bituminous fabric roofing.**
4. **To dwellings in isolated areas where it is not practicable owing to transport difficulties to utilise roofing tiles;**
5. **To poultry-houses;**
6. **To other new dwellings; and**
7. **To farm buildings, other than poultry-houses.**

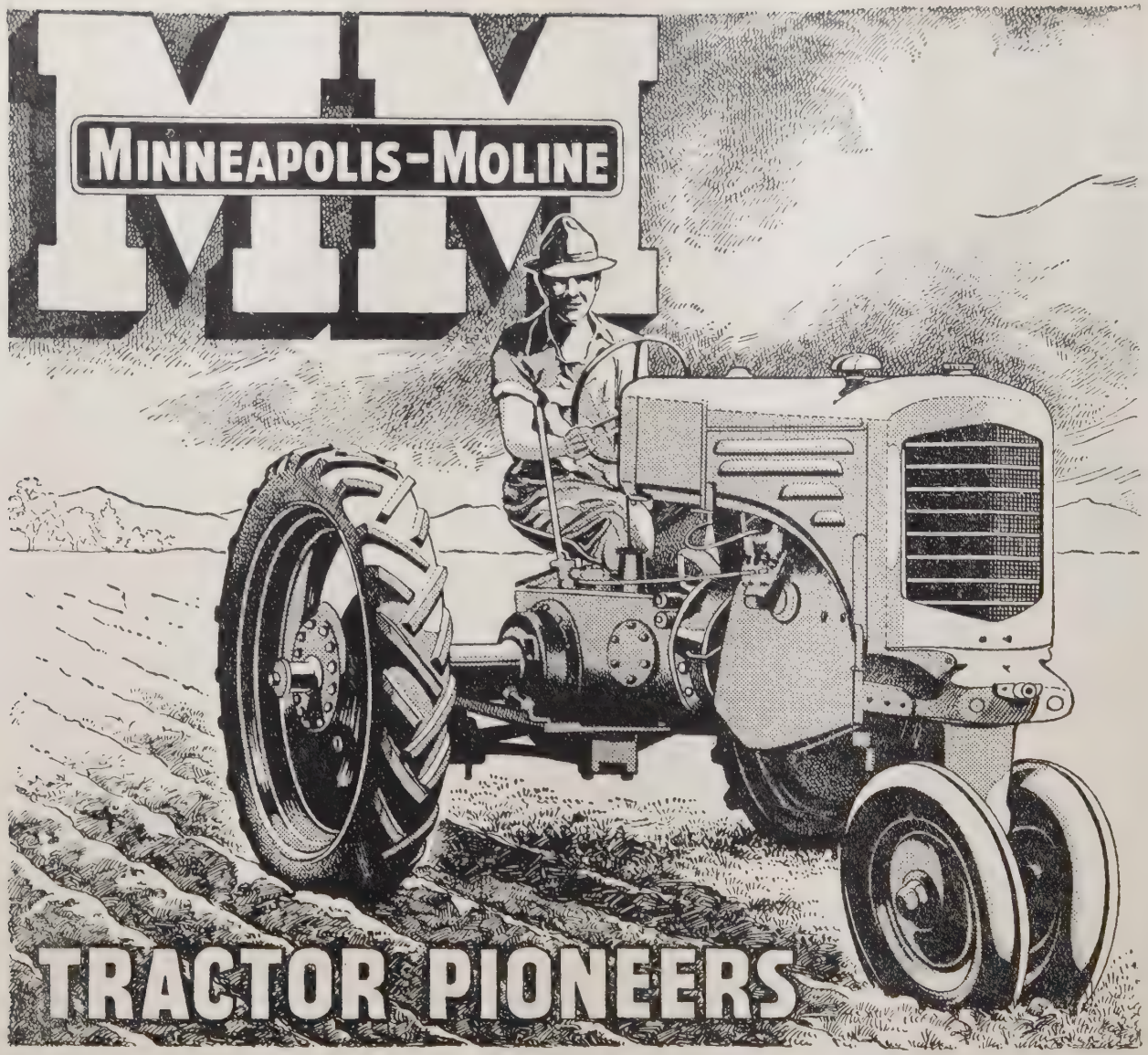
"Whilst the more urgent demands may be met, the present indications are that difficulty will be experienced even in satisfying the demand for roofing purposes covered by priorities 1, 2, 3, and 4, but every endeavour will be made to meet the demand from poultry-keepers for other new buildings and farm buildings.

Bituminous Fabric Roofing

"Bituminous fabric roofing has been used extensively on Government works during the past years, not only on temporary defence buildings, but on permanent hospitals and housing. Similarly, this material will be used in future on buildings of a permanent nature where its use is appropriate. Ample supplies of this material are available at the present time, and deliveries can be effected by merchants against all reasonable orders ex stock. Deliveries of other roofing materials, however, are being quoted three and four months hence. Persons with urgent building requirements, therefore, should arrange to use bituminous fabric roofing. This material is very convenient to use, is the most readily transported of all the roofing materials, and if properly fixed and maintained should give a life, even with a one-layer application, of from 10 to 15 years. Repairs at the end of this period can be readily carried out. This material has been misused to a great extent in the past, and accordingly a diagram illustrating what is considered by the trade to be the most satisfactory and simple method of fixing is shown.

It is fairly obvious from the above statement that asbestos roofing sheets will not be available for farm buildings. Use must therefore be made of bituminous fabric roofing, and farmers are advised to use the method of affixing as detailed below.

Cover the roof with one layer of 2- or 3-ply material laid up and down with 2in. laps. Seal the laps with the bituminous solution which is supplied with the roofing, and tack the laps at 6in. centres. Cover the laps over the clout or tack heads with 2-inch strips of fabric, which should also be cemented down. Cover the fabric strips with 2in. x ½in. battens, dressed on the underside, and bedded on mastic. Secure the timber battens with 1in.-½in. flat-head galvanised nails at 6in. centres, staggered; also fix intermediate battens set on 2-in. strips of fabric, cemented down and secured as for the lap battens.



It is nearly eighty years since the Minneapolis-Moline Company set up in 1865. Beginning as plough manufacturers, it is hardly surprising that they have always been foremost in breaking new ground! MM (formerly known as Twin City) have been pioneers in the design of power implements for farmers, especially tractors. The Twin City steam engine appeared in 1890, and the internal combustion tractor in 1910. In 1915 came the Moline Universal—the first general purpose tractor. MM were first, in 1934, to offer an all-purpose tractor with high compression engine head for burning regular benzine, and five forward speeds. Then came Visionlined design, a feature that adds to the safety, ease of operation and trim appearance of all MM tractors today. During this war MM have been honoured to receive both the United States Maritime 'M' Pennant and the Army-Navy 'E' Award for high achievement. Such Minneapolis-Moline supplies as are available, are distributed through their exclusive Distributors, **Todd Motors Ltd., Wellington.** Dealers throughout New Zealand.

14.4

FARMING IN NEW ZEALAND

NEW ZEALAND is a pastoral country: approximately 43 million acres are under occupation, of which 31½ million acres are in pasture of various types and 1 1-3 million acres devoted to annual crops, of which approximately half are cereals and half fodder crops. The pasture land and fodder crops support 31¼ million sheep (including 20 million breeding ewes) and 4¼ million cattle (including 1¼ million dairy cows in milk).

— By —

MARY AITKEN, Fields Division, Christchurch.

THE total area of New Zealand (and adjacent islands) is 66 million acres and the total area under farming occupation is 43 million acres. The remaining 23 million acres includes urban areas, rural holdings under one acre, Maori communal land, unoccupied Crown land as well as mountain tops, forest, scrub and land unfit for settlement. Improved land occupies 19.8 million acres and consists of sown pasture, field crops and plantations, orchards and gardens: unimproved, occupied land covers 23.2 million acres and consists of tussock and other native grasses, fern, scrub, native forest and barren land (Table 1).

TABLE 1.—LAND UNDER OCCUPATION 1941/42 *

Type of Land.	*Millions of acres.*	*Percentage of area occupied.*
Improved land :		
Sown pasture	17.5	40.8
Field crops	1.3	3.0
Plantations, orchards and gardens	1.0	2.3
	19.8	46.1
Unimproved land :		
Tussock, and other native grass	13.9	32.3
Fern, scrub, and second growth	4.4	10.1
Native forest	2.9	6.8
Barren land	2.0	4.7
	23.2	53.9
Total area occupied	43.0	100.0

(* From A. & P. Statistics: all data quoted in the text unless otherwise stated are for the 1941/42 season).

SOWN PASTURE.

Surface sown pastures and pastures on cultivated land cover 17.5 million acres or 40.8% of the occupied area. Although no recent figures are available showing the area covered by each class, surface sown pastures probably cover 11 million acres (9 million in the North Island and 2 million in the South Island) and pastures on cultivated land 6½ million acres (3 million in the North Island and 3½ million in the South Island).

The surface sown grass areas were sown in the ashes of forest and scrub fires and the main areas were established prior to 1920. The areas now farmed are chiefly confined to hilly and mountainous country and are used for extensive sheep and cattle grazing. Most areas of flat and undulating land, originally surface sown after forest fires, have now been cultivated and re-sown in grass. The pastures were originally sown down with perennial ryegrass, cocksfoot, crested dogstail and clovers, but over large areas the swards have deteriorated and now consist of danthonia and browntop and other areas have reverted to fern, scrub and other second growth.

Pastures on ploughed land are of various types. In the high rainfall districts permanent pastures consisting of perennial ryegrass, cocksfoot and clovers predominate, whilst in the lower rainfall arable districts short and long rotation pastures of various types, but generally with perennial ryegrass as the dominant grass, are of chief import-

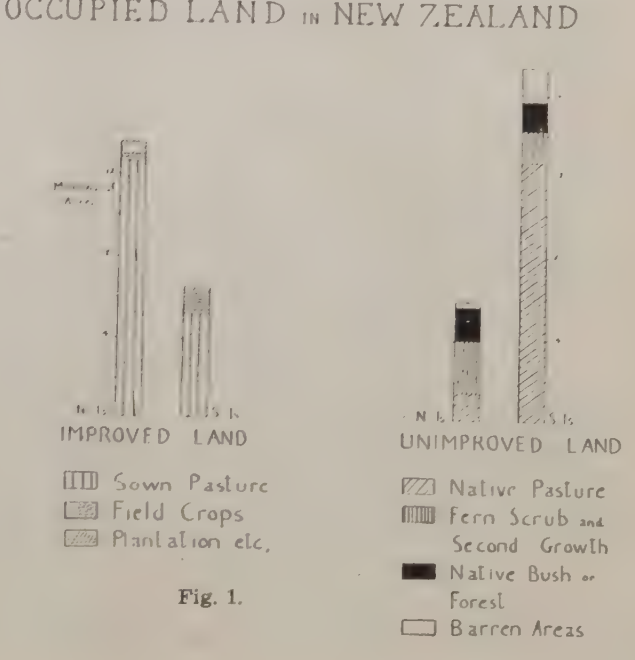


Fig. 1.

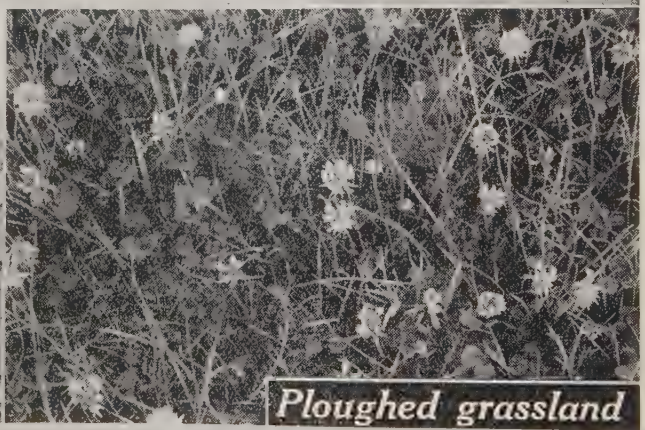
LAND UNDER OCCUPATION

Forest

Tussock grassland

When the early settlers arrived in New Zealand they found no open meadow lands such as they were used to in the British Isles. Practically the whole of the North Island and the western and southern parts of the South Island were clothed in forest and dense scrub, but on the low rainfall areas of the eastern parts of the South Island, and in the central parts of the North Island, were large areas of tussock grassland. The tussock areas were early cut up into extensive grazing runs and the tussock grassland of the South Island covering 12.7 million acres still constitutes a very important pastoral area.

Surface sown grass



Ploughed grassland

As soon as it was found that pastures could be established in the ashes of a forest fire the destruction of forests followed at a very rapid rate. During the period from 1840 to 1922, when forest destruction was at its height, about 28,000,000 acres of forest were cleared for pastoral and milling purposes. Surface sown grass now occupies about 11 million acres and pasture sown on ploughed land 6½ million acres.

Swedes

Oats

To supplement pasture production during periods of low production during the summer and winter, and to provide the cereals necessary for human consumption and stock feed, 1.3 million acres of annual crops are produced, about half of which are fodder crops (chiefly turnips and rape) and half cereals (wheat and oats).

ance. Permanent pastures of special types also occur, e.g., paspalum pastures in North Auckland and browntop pastures in the foothill country in Canterbury.

Pasture topdressing with fertilisers and lime is an important practice in permanent pasture management and 4.2 million acres were topdressed in the 1941-42 season, of which 4 million acres were in the North Island.

Pastures on cultivated land are used for the production of meat and dairy products. Hay and silage saved from permanent pastures form the chief supplementary feed for dairy cows and short rotation pastures provide valuable grass and clover seed crops.

TABLE II.—GRASSES, CLOVERS AND LUCERNE CUT FOR SEED, HAY OR ENSILAGE, 1941/42.

	Acres.
Pastures cut for seed ..	155,000
" " " hay ..	445,000
" " " ensilage	68,000
Lucerne cut for hay or ensilage	42,000
	710,000

FIELD CROPS.

The dependence of New Zealand farming on pastures is emphasised by the fact that only 1.3 million acres (i.e., 3 per cent. of the occupied area) are under field crops, of which approximately half are cereals and half fodder crops.

TABLE III.—CEREAL AND PULSE CROPS, 1941/42.

Crop.	*Acres.*	
Wheat—		
Threshing	258,000	
Fed off, etc.	2,500	
		260,500
Oats—		
Threshing	71,000	
Chaff	143,000	
Fed off, etc.	68,500	
		282,500
Barley—		
Threshing	36,000	
Fed off, etc.	8,500	
		44,500
Maize—		
Threshing	8,750	
Fed off, etc.	5,250	
		14,000
Peas (threshing) ..		31,000
Other crops		9,500
		642,000

Cereal and pulse crops occupied 642,000 acres in 1941/42 (Table III). The area under oats is slightly larger than the area under wheat, but the majority of the oat area is grown for chaff and green feed. Wheat growing is mainly restricted to the drier areas of Canterbury, which produces four-fifths of the total wheat acreage of the Dominion. Maize growing is restricted to the warmer parts of the North Island and grain production is confined to the land districts of North Auckland, Auckland and Gisborne.

Green fodder and root crops are produced for the supplementary feeding of sheep and cattle during periods of low pasture production, e.g., summer and winter. The main crops are rape, turnips and swedes, and production of these crops is concentrated chiefly in the arable farming areas on the east coast of the South Island.

TABLE IV.—GREEN ROOT AND OTHER CROPS 1941-42.

Crop.	*Acres.*
Rape	164,000
Kale and chou moellier	63,500
Swedes	131,500
Turnips	205,500
Turnips and rape ..	40,000
Mangolds	8,000
Potatoes	15,000
Onions	1,000
Linen flax	20,000
Tobacco	2,500
Other crops	7,500
	658,500

Figures 1 to 5 illustrate the distribution of the main field crops throughout the Dominion, marked differences existing between the North and South Islands. Farmers in the North Island rely mainly on grass and pasture hay for stock feeding (Fig. 4), whilst in the arable farming districts of the South Island farmers produce roots and green fodder crops for supplementary feeding (Fig. 5) in rotation with cereal crops (Figs. 2 and 3).

PLANTATIONS, ORCHARDS AND GARDENS.

Plantations occupy 858,000 acres, of which 695,000 acres are in the North Island: conifer plantations predominate and occupy 835,500 acres. There are 9,000 acres used for market gardening and 19,500 acres are under orchards: in both enterprises slightly more than half the acreage is situated in the North Island.

TABLE V.—PLANTATIONS, ORCHARDS AND GARDENS, 1941/42

Use of Land.	*Acres.*
Plantations of conifers	835,500
Plantations of eucalypts	22,500
Orchards	19,500
Market gardens	9,000
Private gardens and land about residences	83,000
Fallow land	110,500
Nurseries	1,000
Tung trees, vineyards, etc.	1,000
	1,082,000

Market gardening and fruit-growing are concentrated on areas where the soil, climate and transport facilities are most favourable: Clutha Valley, Central Otago, Nelson and Hawke's Bay are the chief fruit-growing districts. Fallow land enumerated in Table V is land from which no crop has been taken during the production season: of the 110,500 acres of fallow land, 76,000 acres were in the South Island.

UNIMPROVED OCCUPIED LAND.

When the early settlers arrived in New Zealand they found no open meadow lands such as they were used to in the British Isles. Practically the

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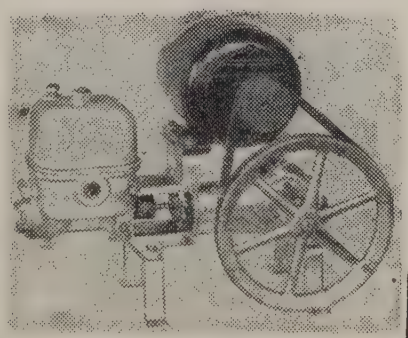

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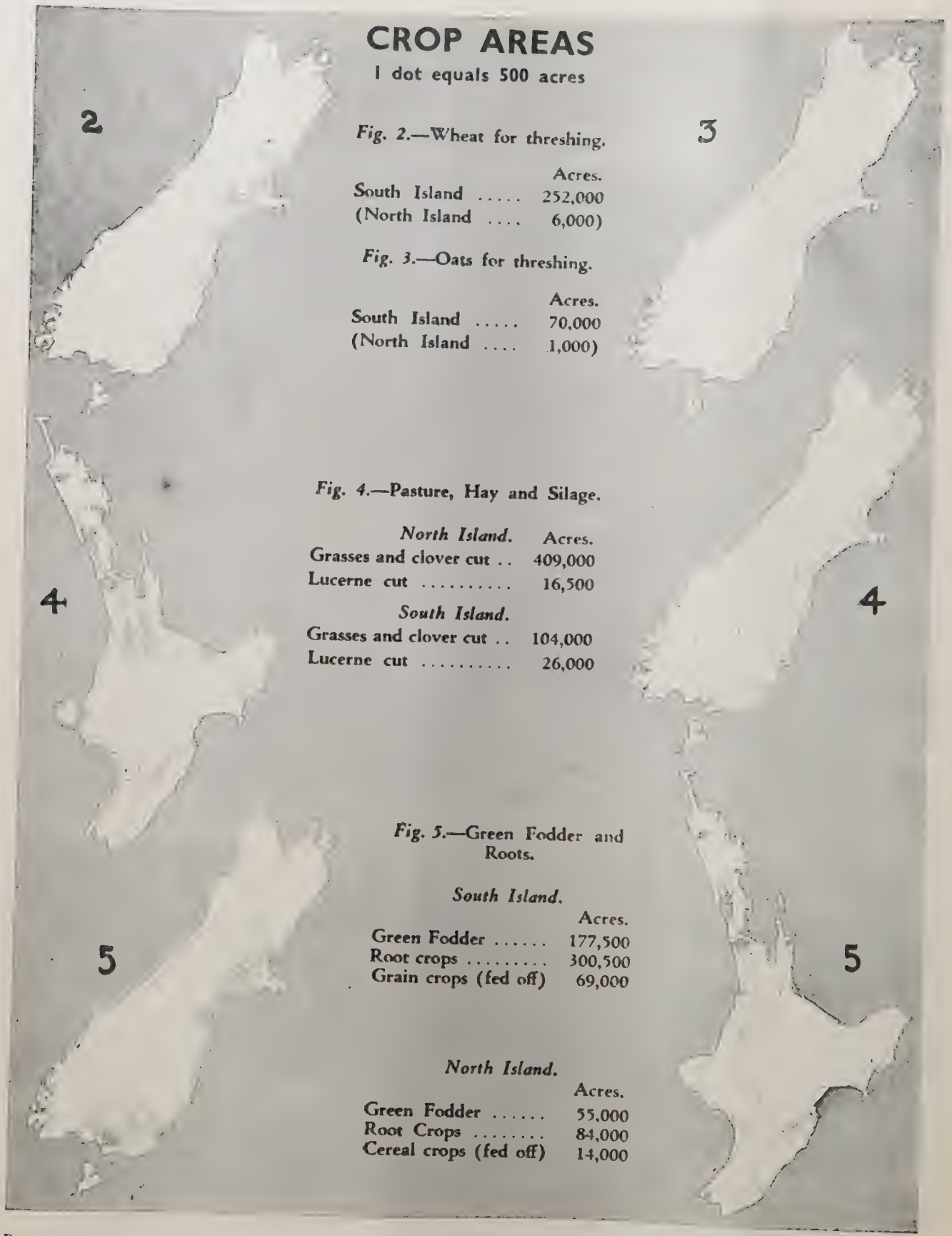

Fig. 2.—Wheat for threshing.

	Acres.
South Island	252,000
(North Island	6,000)

Fig. 3.—Oats for threshing.

	Acres.
South Island	70,000
(North Island	1,000)

Fig. 4.—Pasture, Hay and Silage.

North Island.	Acres.
Grasses and clover cut ..	409,000
Lucerne cut	16,500
South Island.	
Grasses and clover cut ..	104,000
Lucerne cut	26,000

Fig. 5.—Green Fodder and Roots.

South Island.

	Acres.
Green Fodder	177,500
Root crops	300,500
Grain crops (fed off)	69,000

North Island.

	Acres.
Green Fodder	55,000
Root Crops	84,000
Cereal crops (fed off)	14,000

whole of the North Island and the west and southern parts of the South Island were clothed in forest and dense scrub, but on the low rainfall areas of the eastern parts of the South Island and in the central parts of the North Island were large areas of tussock grassland. The tussock areas of the South Island were early cut up into extensive grazing runs and Canterbury and Otago became the home of a huge pastoral industry, whilst North Island production in the early days of colonisation was confined to timber, flax and kauri gum. As soon as it was found that pastures could be established in the ashes of a forest fire the destruction of the forests followed at a very rapid rate. During the period from 1840 to 1922 when forest destruction was at its height about 28,000,000 acres of forest were cleared for pastoral and milling purposes.

At present native forest covers 2.9 million acres of occupied land (i.e., 6.8 per cent. of the total occupied area). Fern scrub and second growth cover 4.4 million acres of occupied land (i.e., 10.1 per cent. of the total occupied area) and these areas represent surface sown hill country which has reverted to fern and scrub or natural scrub land that is in the process of being developed into farms. Reversion of surface sown hill country pastures has occurred mainly in districts of high rainfall and low soil fertility. Further expansion of pastures on cultivated land is likely to be made by developing ploughable scrub land in the higher rainfall districts of the North Island, where good permanent pastures can be secured over large areas of scrub land if the pastures are suitably manured.

TUSSOCK GRASSLAND.

Tussock or native grassland covers an area of 13.9 million acres or 32.3 per cent. of the occupied area and constitutes an important pastoral area in the South Island where it covers 12.7 million acres. At the time of colonisation it occupied practically the whole of the lower rainfall areas on the east of the main divide in the South Island and was early divided into huge grazing runs for pasturing sheep. A large area of coastal plains country originally in tussock has now been ploughed and is used for arable mixed farming, but the mountain and inland tussock areas are still used for pasturing merino and half-bred sheep.

The native tussock grasslands evolved in the absence of grazing animals and, with the exception of blue grass, none of the tussocks is palatable to sheep; but the grazier soon found that the fresh growth following the burning of the tussocks was readily eaten by sheep and this led to the regular burning of the tussock grasslands. Indiscriminate burning, overstocking and destruction caused by rabbits have led to deterioration and in places to actual depletion of all vegetation on the mountain tussock grasslands. Besides the native tussocks, these grasslands contain numerous other indigenous and introduced plants, and it is to such introduced plants as Yorkshire fog, catsear and sorrel that the grasslands owe much of their carrying capacity.

LIVESTOCK.

The sown and native pastures of the Dominion carry 31¾ million sheep and 4¾ million cattle, from which are derived the country's exports of primary produce, e.g., dairy produce, meat and wool.

TABLE VI.—LIVESTOCK 1941/42.

	Millions.
Sheep (1940/41)	
Breeding ewes	20
Other sheep	11¾
Cattle:	
Cows in milk	1¾
Other cattle	3
Pigs	¾
Horses	¼

Pastoral farming in the Dominion commenced with the exploitation of the native tussock grasslands of the South Island and up to the eighties the only exportable products were wool and tallow. The advent of the freezing industry enabled first meat and then dairy produce to be exported. In the early days of settlement merinos were the chief breed grazed on the southern pastoral runs, but with the advent of the meat industry these have been replaced generally with half-bred and Corriedale sheep in the drier districts and with Romney cross-bred sheep in the wetter districts of both islands. The extensive grazing runs on tussock and surface sown pastures provide the fund of sheep from which the intensive graziers on good grassland draw the breeding ewes for fat lamb raising and the store sheep and lambs for fattening.

In 1940/41 there were 31¾ million sheep in the Dominion, of which 18 million were in the North Island and 13¾ million in the South Island: 20 million of the sheep were breeding ewes. Wool production amounted to 331,500,000lb. The details of the Dominion's mutton and lamb production are given in Table VII.

TABLE VII.—MUTTON AND LAMB PRODUCTION.

Killings.	*Year Ending.*	*Sheep.*	*Lambs.*
At abattoirs & slaughterhouses ..	31.3.41	4,610,000	11,972,000
On farms ..	31.1.41	538,000	64,000
Overseas shipments (equivalent carcasses) .	31.3.41	2,630,000	8,367,000

There are approximately 4½ million cattle in the Dominion and slightly over 2½ million of these are dairy cattle of all classes. The total number of dairy cows in milk in 1941/42 was 1¾ million and of these 87½ per cent. were in the North Island and the land districts of North Auckland, Auckland, Taranaki and Wellington have together over 80 per cent. of the dairy cows in milk. Dairy exports for the calendar year of 1941 were 2,263,000 cwt. of butter and 2,366,000 cwt. of cheese. In addition to dairying, cattle are pastured for beef production, and both extensive and intensive graziers pasture cattle as well as sheep. Details of beef production for the Dominion are given in Table VIII.

TABLE VIII.—BEEF PRODUCTION.

Killings.	*Year ended.*	*Cattle.*
At abattoirs & slaughterhouses	31.3.42	627,000
On farms	31.1.42	4,000
Overseas shipment of beef (equivalent carcasses)	31.3.42	286,000

Pigs are kept on dairy farms to utilise the by-products of the butter and cheese manufacture, e.g., separated milk and whey. At January 31, 1942, there were 689,000 pigs, of which 91,000 were breeding sows. Details of pork and bacon production for the Dominion are given in Table IX.

TABLE IX.—PIG MEAT PRODUCTION.

Killings.	*Year ended.*	*Pigs.*
At abattoirs & slaughterhouses	31.3.42	981,000
On farms	31.1.42	22,000
Overseas shipment (equivalent carcasses) ..	31.3.42	534,000

FARMING IN NEW ZEALAND.

The purpose of this article is briefly to outline the salient features of New Zealand farming as an introduction to a detailed study of the subject. Further articles will deal with physiography and climate and the relation of physiographical, soil, climatic and marketing features to the development and distribution of farming.

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Director's Retirement

Mr. W. M. Singleton's Distinguished Service to Dairying

THE retirement, as from July 31, of Mr. Winnard Milton Singleton, Director of the Dairy Division since 1921, will mark the close of a long and distinguished official career. He was one of several Canadians—Ruddick, MacEwan, Kinsella, to name a few—who have played a prominent part in the building of the great dairy industry in this sister Dominion.

He was born in 1878 on a dairy farm in Leeds County, Ontario, and had the benefit of boyhood training in milking and attending to dairy cattle, together with the delivery of milk to cheese factories which his father owned. Thus by heredity and environment the dairy industry was his natural vocation. At an early age he entered a dairy factory, learned cheese and butter making, became manager, and afterwards superintendent to a number of factories, a position similar to that of instructor. During the winter season he attended dairy schools, and finally earned diplomas at Kingston (Ontario), Guelph (Ontario), and Madison (Wisconsin, U.S.A.), three of the foremost dairy schools in North America. Among the subjects included in the diploma courses were dairy bacteriology, dairy chemistry, agricultural physics, dairy cattle diseases, and judging dairy cattle. Before leaving the Madison School he was employed on the staff for a period as instructor. The names of some of the college professors from whom he received tuition are known throughout the dairying world, among them being Dr. S. M. Babcock, E. H. Farrington, Professor King, Professor H. H. Dean, and G. G. Publow, to whom he was assistant.

Mr. Singleton came to New Zealand in 1901 as a dairy instructor, being chosen for the position by Mr. J. A. Ruddick, who had been Dairy Commissioner here in 1898, and returned to Canada in 1899. After serving for eight years on the instructional and grading staff, Mr. Singleton was appointed Assistant Director of the Dairy Division in 1909, and on Mr. D. Cuddie's retirement in 1921 became Director. It was while carrying out duties as instructor that he introduced the curd test, the acidimeter, and prepared pure culture starters to New Zealand cheese makers. All of these factors are still of major importance in cheese manufacture.

During his first year as Assistant Director he was made responsible for the introduction of the systematic testing of dairy herds for yield. This was followed in 1912 by the introduction of what is now known as the Certificate-of-Record Testing of Pure-bred Dairy Cows. These two systems were the foundation of the herd-testing movement which exists today. The Government Official Herd Test was introduced in 1928.

By the time he was appointed Director of the Dairy Division in 1921 methods of manufacturing butter and cheese had settled down to a more or less accepted standard procedure, and consequently his energies since then have been devoted principally to administration and organisation. Much has been accomplished during the intervening years, and many difficulties overcome, with the result that due to his direction the New Zealand dairy industry is today on a better footing than ever before.

Many minor reforms and much important legislation have been required to achieve the present position. In all cases the principal objectives have been honesty, efficiency, and organisation.

In 1922 on his recommendation a Dairy Industry Amendment Act was introduced and passed. This required owners of dairy factories to advise suppliers of the yield of cheese or butter obtained per pound of butterfat delivered to the factory during each financial year, and also gave the division authority to check the testing of milk and cream samples for butterfat at dairy factories. Special inspectors were later appointed for this work, and for many years the periodical checking of factory testing has been a regular part of the division's service to the industry.

In 1925 the standard of minimum grade points for first-grade butter and cheese was increased, and an improvement in the quality of both butter and cheese was soon noticeable as a result.

In 1926 the Dairy Produce General Regulations, which superseded regulations gazetted as far back as 1899, came into force. The preparation of these regulations constituted a large and difficult task, and they served the industry well until many changes and advances made necessary the Dairy-produce Regulations, 1938, and the supporting legislation, the Farm-dairy Instruction Regulations of the same year.

It was also in 1926 that the compulsory grading of cream with differential payments according to grade was introduced. Milk grading, without differential payments, was introduced in 1932, the compulsory differential payments requirement being brought in a year later.

MR. W. M. SINGLETON

The laboratory aspect of the division's work was provided for by the appointment of a dairy bacteriologist in 1928, this work at present being carried on under a dairy chemist appointed in 1931.

In 1928-29 Mr. Singleton paid an official visit to the United States, Canada,

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Great Britain, and the Continent of Europe to gain first-hand information relating to our export trade in dairy products, and to manufacturing methods in other dairying countries.

The latest achievement of special importance was the introduction of a Dominion-wide farm dairy instruction service in 1938. This service, which places under regular examination all milking sheds and milking machines and separators used in connection with the supply of milk and cream to dairy factories, provided a final and important link in the chain of instruction and supervision previously built up.

The growth of the dairy industry during his term of office may be gauged by the fact that for the year ended March 31, 1921, in which he assumed the position of Director of the Dairy Division, our exports of butter and cheese were valued, for Customs purposes, at £12,629,000, whereas for the financial year just ended the value was £23,462,000, or nearly double.

His experience as Assistant Director during the Great War has been invaluable in qualifying him to deal with the difficulties of the present war. Endless tact and mature judgment are needed to meet the problems of maintaining quality, diverting supply where most needed, using a depleted staff to best advantage, and generally dealing with the multitudinous emergencies, expected and unforeseen, which war inevitably creates.

Mr. Singleton's official career has been characterised by honesty of purpose, fearlessness, and far-sighted administration. He has always stressed instruction rather than inspection, co-operation rather than coercion, and all new movements which have been brought into operation during his term of office have been suggested by the industry itself or made operative with the full consent of the industry. Thus much has been attained with little friction.

In length of service and achievement his record is unsurpassed, and he will leave behind him an organisation and an example which will pave the way for whatever extension or adjustment the future course of the dairy industry affairs of this country may necessitate.

The best wishes of the Department go out to him for many years of well-earned relaxation.

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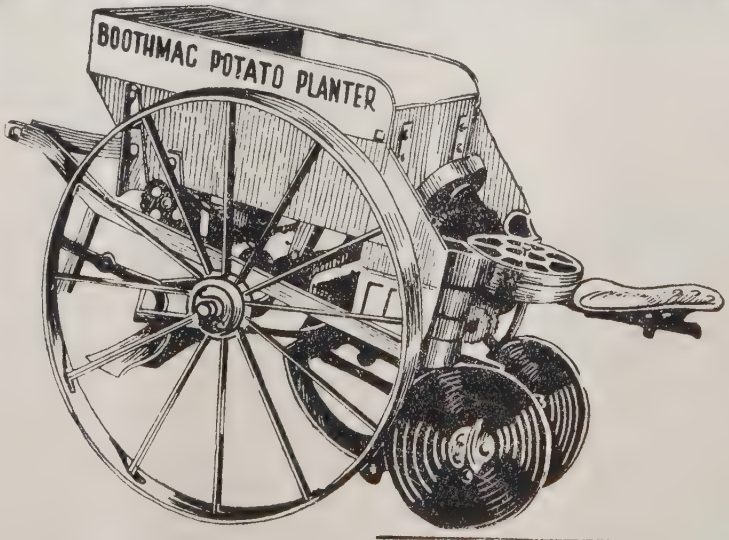

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Phenothiazine

Use for Control of Internal Parasites

— By —

L. K. WHITTEN,
Parasitologist, Animal Research Station, Wallaceville

THE control of internal parasites of domestic stock has been a problem studied by scientists for many years. Numerous drugs have been introduced, but each one, if effective at all, can be used against only a few species of parasites. Copper sulphate alone or with other drugs was proved to be effective against the large stomach worm of sheep and cattle. Oil of Chenopodium has been used for many years in the treatment of parasites of man, horses, and pigs. Later, carbon tetrachloride was used against hookworms in man and dogs, the large stomach worm, and the liver fluke in sheep and redworms in horses. Tetrachlorethylene was introduced by American workers for the treatment of hookworms in man and dogs, and more recently hookworms, stomach worms, and small intestinal worms in sheep and cattle. A mixture of copper sulphate and nicotine sulphate has been useful in the control of stomach and intestinal worms of sheep and cattle, and in recent years has been very widely used.

Most of the drugs used against stomach and intestinal worms of ruminants must pass directly to the fourth stomach to be effective. When they pass into the first or second stomach they become greatly diluted, and have little or no effect on the parasites. In normal circumstances drenches pass to the fourth stomach in approximately 50 per cent. of cases, but copper sulphate has the property of causing reflex closure of the oesophageal groove, so that other drugs mixed with it or given immediately afterwards pass to the fourth stomach in approximately 80 per cent. of cases. Two drugs, however, are effective irrespective of whether they are swallowed into the first, second, or fourth stomach—carbon tetrachloride and phenothiazine.

Discovery of Phenothiazine

Phenothiazine was first synthesised in 1885, but it was not until 1934 that it was investigated as a possible substitute for lead arsenate in the control of codling moth. In 1938 it was found that when given in small doses to cattle it prevented the development of hornfly larvae in their faeces, and in the same year was used against worms in pigs with promising results. In the following years much work has been done in U.S.A., Australia, Canada, and Great Britain, and has shown that it is the most effective drug yet discovered for the treatment of many of the more important parasites of sheep, cattle, horses, and pigs.

In sheep and cattle it is highly effective against large stomach worms (*Haemonchus contortus*), medium stomach worms (*Ostertagia circumcincta*), small stomach and intestinal worms (*Trichostronglyus spp.*), hookworms (*Bunostomum trigonlocephalum*), and large bowel parasites (*Chabertia* and *Oesophagostomum spp.*). Although very little data is available, it is probably only partially effective against *Cooperia* and *Nematodirus*, while it is ineffective against fluke, tapeworms, whipworms, lungworms, and *Strongyloides spp.*

In horses it is highly effective against redworms (*Strongylus* and *Trichonema*), partially effective against large roundworms (*Ascaris*) and pinworms (*Oxyuris*), but is ineffective against bots and tapeworms. The drug is effective against roundworms and nodule worms in pigs, but in poultry only the caecal worm *Heterakis* is susceptible. In dogs it is practically useless.

Methods of Administration

Phenothiazine itself is a bulky, light-green, or yellow powder, which is insoluble in water and practically tasteless. Its physical properties make it very difficult to obtain an even suspension of the powder in water, and for this reason it is generally sold mixed with a small percentage of a wetting agent. In the case of animals which are fed individually the dose can be administered mixed with the feed; with horses this proves very convenient, and most animals readily take the drug in their chaff or mash. This method should not be used where two or more animals are fed from the one manger.

Where animals are to be dosed methods of administration differ from those used with other drenches because of the bulkiness and insolubility of the drug. It can be suspended in water to form a thin paste, which can be delivered through a simple syringe type of instrument if the plunger is kept well oiled and cleaned regularly. Automatic guns and syringes involving the use of ball valves are unsatisfactory, because the powder causes clogging of the valves. An alternative is to use a more fluid suspension with an old-fashioned drenching funnel or bottle. Dosing with the powder or in the form of pills or capsules is possible but less satisfactory, and is more time-consuming than in liquid form.

Dose Rates

The dose rates which are recommended are as follows:—

	Grams.
Lambs.—6 weeks to 5 months ..	15
Sheep.—5 months to 12 months .	20
Sheep.—Over 12 months	25
Calves.—Up to 6 months	25-30
Calves.—6 months to 12 months	30-40
Horses.—6 months to 12 months	20-30
Horses.—Over 12 months	30-40
Pigs—Up to 25 lb. liveweight ..	5
25-50 lb.	9
50-100 lb.	12
100-200 lb.	20
Over 200 lb.	30

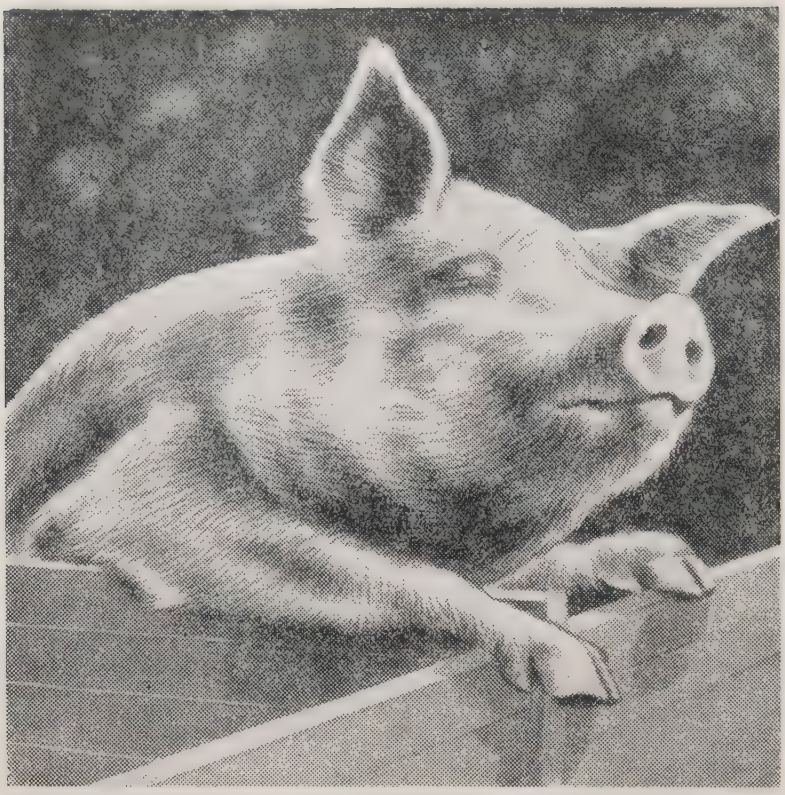
Animals need not be starved before or after treatment, but a short fast may ensure that the whole dose is consumed when exhibited in the feed. Doses greatly in excess of those recommended can be given without ill-effects, but care should be taken with weak and anaemic horses, as a few reports from overseas suggest that such subjects may react severely with larger doses. Repeated doses in calves and pigs may occasionally prove toxic, but such ill-effects are rare.

For a few days after dosing the urine of treated animals becomes dark red when exposed to air for some minutes, due to the presence of oxidation products of phenothiazine, but, apart from a slight staining of the wool, it is of no consequence, although it may be mistaken for blood and cause some concern.

Because of its high efficiency against such a wide range of internal parasites and its wide margin of safety, phenothiazine, which is now available in New Zealand, is welcomed as one of the greatest contributions made in recent years in the field of parasite control. The present price of the drug is high, but a greater demand, manufacture on a large scale, and improved methods will doubtless result in a reduction in cost and permit its more widespread use in reducing loss from internal parasitism.

SUBSCRIPTION RATES.

The *Journal* is issued monthly. The subscription within New Zealand, which is payable in advance and includes postage, is 2s. 6d. a year. The overseas subscription is 5s. Subscriptions should be forwarded or paid direct to any office of the Department of Agriculture in the Dominion. Single copies, price 6d., are available from the Department of Agriculture, Box 3004, Wellington.



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Many pig-farmers, however, have no facilities for mixing, and few if any have the technical means or equipment to test the value of separate ingredients so as to use them to the best advantage. This service is done for you under the guarantee of the brand "Tomoana," in the manufacture of TOMOANA PIG CONCENTRATE, and it is for these reasons that Tomoana Pig Concentrate has been developed. This complete ration is literally packed full of nourishment—proteins, carbohydrates and fats, and in addition is fortified with minerals, trace elements and vitamins.

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Mangold Growing in South Canterbury

Although the mangold crop constitutes only a small percentage of the supplementary feed crops grown in Canterbury, it forms a very necessary part of the feed supply in certain types of farming, notably in dairy farming. Of late years it has also been used more widely on sheep farms on account of the difficulties encountered in growing other root crops. The popularity of mangolds as a feed crop is on the increase, and during the years since 1930 the area grown in South Canterbury has increased almost 100 per cent. This increase is no doubt due to a number of causes, but in the main the climate and soil conditions of the locality must be suitable, otherwise the increase would not take place and farmers would not continue their interest in the crop.

— By —
J. D WRAIGHT,
Fields Instructor, Timaru

SUITABLE conditions include a climate which provides a maximum of sunshine and a soil which can be cultivated to the required tilth early in the spring, viz., early September. Under such conditions the mangold crop is capable of yielding high tonnages of roots (from 40 tons on medium soils to approximately 100 tons per acre on really heavy soils), which in themselves provide a useful feeding-stuff for the wintering of stock.

The soil type favoured by the mangold is the rich loam which is found along our coastal areas, although it may be grown successfully on clay loams of the "down" country on which quite satisfactory yields of from 30 to 40 tons of roots can be produced. On the very light stony soils and the colder marginal areas of the foothills the mangold does not yield well, although a few isolated crops are seen throughout such country each year.

Thorough Cultivation

Given the right type of soil, the next concern is that of cultivation. A deep and thorough cultivation is most necessary, starting with skim ploughing of lea land during the early autumn months. After this working has been cultivated, deep ploughing should take place in May, and the soil allowed to lie up to the frosts and so mellow down to that condition required for the seed-bed. Final cultivation should be made to allow the seed-bed to be ready for sowing in the first weeks of September.

There are two main methods adopted in the sowing of mangolds. The first is by the use of the "combined ridger" which in one operation puts up a ridge, sows manure both with the seed and in the bottom of the ridge, sows the actual seed itself, and finally covers over the sowings at the correct depth. This method is certainly very quick and only one operation is required in the sowing, but in dry districts such as South Canterbury it leaves a lot to be desired. The main objection to sowing with the "combined ridger" is that in dry seasons the seed is not sown in the main tilth (in which the moisture is to be found) but is sown in a collection of dry soil which has been gathered by the machine from the surface of the paddock into the ridge.

The second method, which is more favoured by reliable mangold growers, is the "older fashioned" method of first putting up the ridges 28 in. apart with the ridge plough, then waiting for a period of up to 10 days to a fortnight which allows the moisture to come right up through the entire ridge. The ridges are then rolled, and after a period of about a week the seed and manure are sown with the "barrow," that is, a machine capable of sowing usually two rows at a time and fitted with seed and manure boxes, sowing attachments, and rollers.

The above methods are concerned with sowing on ridges 26 or 28 in. apart, which allow for a maximum amount of inter-cultivation to be done as the seedlings grow. Some farmers have been known to sow mangolds "on the flat," that is, with the ordinary grain drill at distances between rows of 14 in., and occasionally at 28 in. apart. Sowings "on the flat" cannot be recommended as a general procedure.

Seeding and Manuring

The rate of seeding of mangolds is usually 4 lb per acre, which if sown under conditions of good soil preparation and adequate soil moisture gives sufficient seedlings to allow for thinning out to 10 to 12 in. apart in the rows. As mangolds are gross feeders fairly large quantities of phosphate are sown at time of seeding, 4 to 5 cwt. of superphosphate being a normal sowing. In pre-war times, when potash was available, many growers liked to include 1 cwt. or more of 30 per cent. potash salts, or where this was not available a similar quantity of agricultural salt was used. After thinning the crop horse hoeing should be continued until the growth of leaves renders this work difficult.

Of the varieties more commonly grown in South Canterbury, the Long Red and Red Intermediate varieties are usually grown on the heaviest soils, while the globe varieties such as Orange Globe and Yellow Globe are grown on the medium to good soils. At the outbreak of war steps were taken by the Department of Agriculture to ensure that seed which is usually imported would be produced locally. As a result, seed of the more common varieties, namely Yellow Globe, Orange Globe, Long Red, and Red Intermediate, is grown under Government supervision.

A ridge roller.

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Feeding Out

It is usual for the mangold crop to be lifted in the fall of the year and to be carted into "pits," which are actually long heaps of roots covered over with straw to protect them from frost damage. Feeding out "pitted" mangolds to stock should not commence until the roots have been in the pit for at least one month, which time allows them to ripen fully. Mangolds are usually fed out to dairy cows and sheep on grass paddocks together with a supplement of hay or other dry feed and this ration is sufficient to maintain milking cows or ewes in lamb and lambing.

Answers to Correspondents

Milking Machine Inquiry

H.F. (HAWERA):—

I would like to ask through your "Journal"—What is good pulsation? What constitutes good inflations, and what is the necessity for "good relief valves"? One can see if they stick by the vacuum gauge.

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Pulsation.—For use with soft inflations we recommend a ratio of 40:60 (squeeze:release) and a rate of 40 pulsations a minute (approximately). Rectangular ported valves are suggested, one port being used per set of cups with the valves as near the cup as is possible. For moulded inflations a ratio of 50-50 is recommended, other conditions being as above.

Inflations.—Soft inflations, to be kept in good order, must be changed and tightened regularly. We suggest tightening after the second, third and fourth weeks and changing after every five weeks. Moulded inflations vary with the type and the suppliers' recommendations should be taken.

Relief Valve.—There are two main reasons for maintaining the relief valve in good order:—

(1) The relief valve is the safety valve of the machine. It should not permit the vacuum to rise significantly above a predetermined value. Vacuum gauges are unreliable. We have seen gauges in use as far out as 5 inches; such errors may remain undiscovered for some time.

(2) Unless a relief valve is sensitive, air will be lost during periods of heavy demand on the pump. The ideal valve shuts immediately there is a demand on the air handled by the machine and opens again as soon as the vacuum rises to normal. A good valve may thus help to speed up milking and keep the cups on.

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Lemon Culture in New Zealand

— By —

W. K. DALLAS (N.D.H.N.Z.),
Director, Horticulture Division, Wellington.

(Continued.)

Harvesting

The care and skill required for picking, curing, and marketing lemons is as great as that needed in establishing and maintaining the orchard itself, and the results obtained at the harvesting stage necessarily mean success or failure of the whole venture. That lemons can be grown successfully in the warmer parts of the Dominion has been amply demonstrated, but this is not in itself sufficient to ensure the establishment of a successful lemon industry. There is demanded in addition a much more complete knowledge and practice of the art of curing than at present obtains in New Zealand to enable the grower to carry his fruit with a minimum of loss over such periods as the exigencies of the market may demand.

Picking

Careful handling during picking and carting to the packing-shed is essential to prevent injury to the skin of the lemons. It is necessary for the pickers to wear gloves to prevent scratching of the skin with their finger nails. The lemons should be removed from the laterals with sharp clippers with rounded nose. The stalk should be cut back to a mature bud about an inch and a half from the fruit and then double clipped to remove the stalk and to ensure that it is trimmed level with the button, for unless this precaution is taken the protruding stem-spikes are liable to damage fruits with which they come in contact.

The fruits should not be dropped, but laid in a padded tin or in a picking-bag, which should be so made as to open at the bottom. When sufficiently full the lemons must be carefully transferred to the orchard box, which should not be filled to within more than 1 in. of the top. To roll the fruit roughly into the boxes causes bruising and stem punctures and an ultimate heavy loss, for storage rots usually gain an entrance to the fruit only through injury to the skin.

The orchard boxes should be smooth inside, have no protruding nails, and should be closely boarded on the bottom to prevent the entry of stubble, etc., which may cause injury to the fruit. The boxes should be disinfected prior to each picking in a solution of formalin (40 per cent.), 1 part to 120 parts water.

In orchards where ladder-work is necessary pickers should avoid resting their weight on the picking-bag containing lemons, and, when descending, the fruit should not be allowed to bump against the ladder. Several days should be allowed to elapse after rain before picking is proceeded with. Fallen fruits should not be placed into the orchard box with the picked fruit, but kept separate. After picking, the fruit should not be left exposed to the sun.

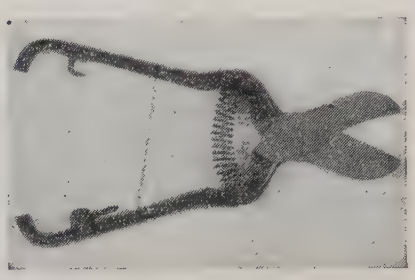
Lemons should be picked when they reach the size desired by the trade, which is approximately 2¼ in. to 2½ in. in diameter. To obtain the finest grade and long keeping they should be picked when they are green or silver-green in colour. Fruit ripened on the tree is usually oversized and coarse, is not amenable to the curing, and is usually disposed of to the factory for the preparation of peel and juice. In order to harvest the lemons in proper condition a picking should be made at least every four weeks, and in some situations once in three weeks is necessary. Growers who do not pick as often as this have in consequence a higher percentage of oversized and yellow lemons than is desired where all the fruit is required for curing.

In loading the wagon care should be taken to see that the fruit has remained below the level of the boxes so that it will not be crushed by the boxes placed on top. The boxes should not be bumped down nor stacked any higher than a person can conveniently reach, which is about six tiers high.

Dipping and Sorting

After delivery at the packing-shed freshly picked lemons should be stored for three days — this tends to reduce the possibility of skin injury during the dipping and sorting operations.

Prior to colouring and curing, the dipping of the fruit in various solutions such as borax and bicarbonate of soda for prevention of green and blue mould has been practised for many years, but the treatments used in most instances have given unsatisfactory control. The borax treatment, using 8 lb. borax to 10 gallons water heated to 110 deg. F., has given the most promise. The fruit should be held in the solution for four minutes, then drained, dried, and placed in clean, sterilised trays, which should be lined with clean paper. This treatment should be done in a room with an atmosphere which is free from mould spores.



Type of lemon-clipper used in Tauranga district.

The trays used to hold fruit in the curing-room should be well washed and then sterilised with formalin (40 per cent.), 1 part to 120 parts water. The trays should be dried thoroughly, stacked, and covered carefully to prevent contamination while awaiting to be used. Mould infection takes place only through breaks in the skin of the fruit. No dip treatment can take the place of careful handling.

The lemons are sorted according to the following colours: (1) Dark green, (2) silver-green, (3) "coloured," and (4) "tree ripe." The first two grades are the best for long keeping; the "coloured" grade under similar conditions usually does not keep as long as the green grades, and should be marketed earlier. The "tree-ripe" class should be disposed of for peel and juice purposes, etc. The fruits of the respective grades should be kept separate throughout on account of the different keeping qualities and different periods required for curing.

Colouring

As the majority of lemons are picked green from the tree, colouring is prac-

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tised to hasten the development of a bright natural lemon colour in the fruits. The colour may be developed by either sweating or by gas treatment. Sweating may be carried out either by storing the fruit in rooms or tents, which should be kept dark, or by keeping the fruit covered with thick canvas or other suitable material. The temperature of 70 deg. F. and a relative humidity of 75 per cent. to 80 per cent. should be maintained as nearly as possible for a period which, on the average, is from seven to ten days. Under these conditions the period depends on the degree of colour in the fruit when picked. At a lower temperature the colour will not develop so quickly, while insufficient relative humidity will cause the skin of the fruit to harden and shrivel. To maintain the correct temperature and relative humidity moisture and artificial heat are necessary.

The gas method of colouring lemons is used extensively, either the gas generated from kerosene stoves or ethylene gas being employed. It is stated that the gas treatment somewhat reduces the storage life of the fruit.

A room fitted with a door and a window which have been made airtight is suitable for the colouring treatment. The window is necessary to see, from outside, the instruments for the taking of the temperature and relative-humidity readings. In filling the room the trays, loosely packed with one layer of lemons, should be stacked with 1in. dunnage between them and with a space between each tier of trays to allow the gas to reach the fruit. A fan or other means of mixing the gas with the air should be installed. The colour continues to develop after the removal of the lemons from the sweating or colouring room.

Paraffin-oil stoves, Perfection B type, or other types fitted with a perforated tin sheet placed on top of the burner to cause incomplete combustion of the kerosene are in use in some countries. A vessel of water is placed on top of at least one of the burners to create the desired humidity. The stoves are placed below the room, and the gas, heat, and moisture pass upwards through a grated floor or in an adjoining compartment from which the gas, heat, and moisture are delivered into the colouring-room by means of a blower. Two stoves are sufficient to colour four hundred cases. In other countries this method is being replaced by the ethylene-gas method, which is cleaner and more satisfactory. Ethylene gas is recommended by the manufacturers for use in airtight rooms at the rate of 1 part of ethylene to 5,000 parts of air. In rooms which leak a higher concentration is necessary. The gas is liberated into the room, from a cylinder with measuring apparatus attached, through an iron or steel pipe. The temperature should be maintained at between 60 deg. and 65 deg. F. and the relative humidity about 80 per cent. Two doses per day, one in the morning and the other in the evening, are injected into the room. The lemons under normal conditions are coloured sufficiently in from four to five days. An essential part of the treatment is to ventilate the room thoroughly for an hour before releasing a fresh dose of ethylene so as to replace the oxygen which the fruit has used and to clear out the old gas. It is stated that where ventilating is neglected the buttons readily fall from the fruit. When the colouring process has been completed the lemons should be sorted to remove those of doubtful keeping-quality. The sound fruit should be washed, dried, and placed in single layers in trays for transference to the curing-room.

Fig. 5.—Sorting lemons on arrival at the shed into dark-green, silver, "coloured," and "tree-ripe" grades.

Washing

The lemons should be washed and gently brushed to improve the appearance of the fruit by removing all adhering dust and dirt. In brushing lemons, particularly those which have grown quickly, the greatest care must be exercised if injury to the skin is to be avoided. After washing, if no other means of drying is available, the lemons should be dried quickly in an airy shed, preferably in a position between two open doors where a draught of air may continuously pass over them.

Curing

Lemon-curing is a term used to indicate a treatment of mild dehydration

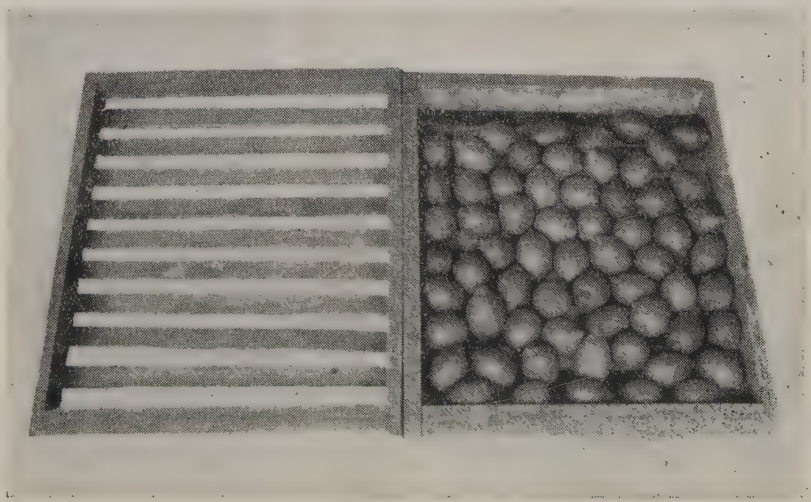

Fig. 6.—Left: Empty tray. Right: Tray filled with one layer of lemons.

to which lemons are submitted to improve the quality of the fruit and to extend the period for which it may be kept in sound condition. The treatment causes the skin to become thinner and tougher. The rind of a properly cured lemon should be smooth and soft.

It is essential during the curing process to maintain a plentiful supply of fresh air. The humidity of the room should not be allowed to fall too low, otherwise the skin of the fruit is apt to shrivel. The relative humidity is determined by means of a hygrodeik, and a reading of 75 per cent. is suitable. An increase in humidity can be effected by sprinkling the floor of the room with water, and some such plan is usually resorted to when the hygrodeik reading falls below 70 per cent.

A cool, even temperature between 40 deg. and 65 deg. F. tends to reduce the liability of green and blue mould-infection in lemons and enables them to be kept longer than those held at other temperatures. If occasion arises, the curing process may be hastened by increasing the temperature, but this should not exceed 75 deg. F. The curing-room should be darkened and draughts avoided.

The stacks of trays should be arranged in blocks with avenues between each block to allow of a free circulation of air. When the trays are being placed on or being removed from the stacks they should be lifted and not pushed or drawn, as this is liable to scrape the fruit on the tray below. The top tray of each stack should be covered with canvas. Cases with one-piece sides or with close-boarded sides are used with satisfactory results by many lemon-growers for curing.

Each colour grade, as determined at the time of sorting of the respective pickings, should be kept in separate blocks, so that the condition of each lot of fruit may be checked regularly to ensure its being marketed when it reaches prime condition. To complete the curing process under normal conditions takes from four to six weeks; very dark-green lemons take from six to ten weeks.

Since mould is usually much more prevalent during the period August-November, the fruit in the curing-room during these months should be examined at least once a fortnight and mould-infected fruits removed. During the remainder of the year examinations should be made at intervals of three weeks. Infected fruit should be handled so as to prevent the spores from being disseminated into the atmosphere of the room. Suitable provision should be made for the disposal of rotten and mould-infected fruits to prevent the spores from entering the atmosphere of the curing and packing shed. Such fruit should be collected in moistened sacks or other suitable receptacles and not placed in open boxes.

The fruit should be held under curing-room conditions until ready for grading and packing prior to shipment.

SUMMARY OF RECOMMENDATIONS RELATING TO PICKING AND CURING.

(1) Lemons should be picked green, when they reach the size of 2¼ in. to 2½ in.

(2) The pickers should wear gloves in order to prevent finger-nail injury to the fruit. Picking should be done by means of a specially designed sharp clipper with rounded nose. The stems of the fruit should be cut in such a way as to avoid injury to the "button" and leave no stem-spikes—this in most instances necessitates double clipping.

(3) The fruit should be picked carefully and laid into a suitable picking-bag, and thence placed in the orchard boxes, which should be well made, closely boarded on the bottom, perfectly smooth, and without protruding nails on the inside. Before use the boxes should be cleaned and disinfected with formalin solution (40 per cent.), 1 part to 120 parts of water.

(4) Orchard boxes should be filled to not more than 1 in. of the top, handled carefully, and conveyed to the packing-house in vehicles fitted with springs, the load being in accordance with the strength of the springs.

(5) In the packing-shed the fruit may be dipped in borax solution, dried, and then sorted into the following colours: dark green, silver-green "coloured," and "tree-ripe."

(6) The fruit may be coloured by sweating or artificially coloured by means of kerosene-stove fumes or ethylene gas.

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(7)The lemons should be washed and then dried before being cured.

(8) The "coloured" grade should be packed and disposed of before other grades of cured fruit.

(9) The curing-house should be of such construction as will maintain even temperature and relative humidity, and ventilated adequately in such a manner as to admit conveniently large supplies of air when required.

(10) Standard grading should be adopted, and particular attention given to eliminating inferior fruits.

Grading and Packing

The building should be sufficiently large to enable a full crop to be handled conveniently. Packing-houses are usually built to meet individual requirements in respect to receiving fruit from the orchard for washing, colouring, curing, grading, and packing. Considerable thought should be given to the design and lay-out of the building to ensure easy working and a minimum of handling.

The colouring and curing rooms should be constructed 4 ft. above the ground so as to allow of a sufficient height for the stove-rooms built directly below the colouring-rooms, and to allow for ample ventilation beneath the curing-rooms.

Grading has become a matter of considerable importance owing to the increased competition due to greater quantities of lemons reaching the markets. Faulty grading is detected quickly by the buyers, and only good, carefully-graded and packed fruit realises satisfactory prices. The demand is always keener for consignments which have the reputation of being well graded.

The sizing of the fruit, the grading for quality, and the removal of damaged and blemished lemons usually are done by hand. In grading the greatest care must be exercised, and persons handling the fruit should wear gloves. A considerable amount of skill is required to maintain throughout a grade of even standard and of good quality. To meet the need for uniform grades throughout the Dominion official grade standards for lemons have been gazetted.

Growers and packing organisations should bear in mind that their fruit comes in direct competition with that of other growers who have attained a high degree of skill in this work. The pack should be tight and attractive,

Fig. 7.—Stacks of trays of lemons in curing-room (at Tauranga).

and to obtain this result the lemons selected for the case should be uniform in size, colour, and quality. There is nothing complicated or difficult about packing, and to become a good packer it is necessary merely to have a knowledge of the fundamental principles, together with practice in the actual operations.

The handling of the lemon crop, other than the Meyer variety, is now undertaken by the Internal Marketing Department.

By-Products

In all citrus areas there is a proportion of the fruit which is below the quality required by the markets, such as over-large, coarse, and tree-ripened lemons. This class of fruit usually can be disposed of for the making of lemon-juice and candied peel. The manufacture of other by-products such as lemon-oil, pectin, citric acid, and citrate of lime, etc., has not yet been developed in the Dominion.

"The Citrus-growing Industry: How to Establish an Orchard," Bulletin 206, is available **free** from offices of the Department of Agriculture.

Fig. 8.—Lemon curing and packing shed at Tauranga operated by the Internal Marketing Division.

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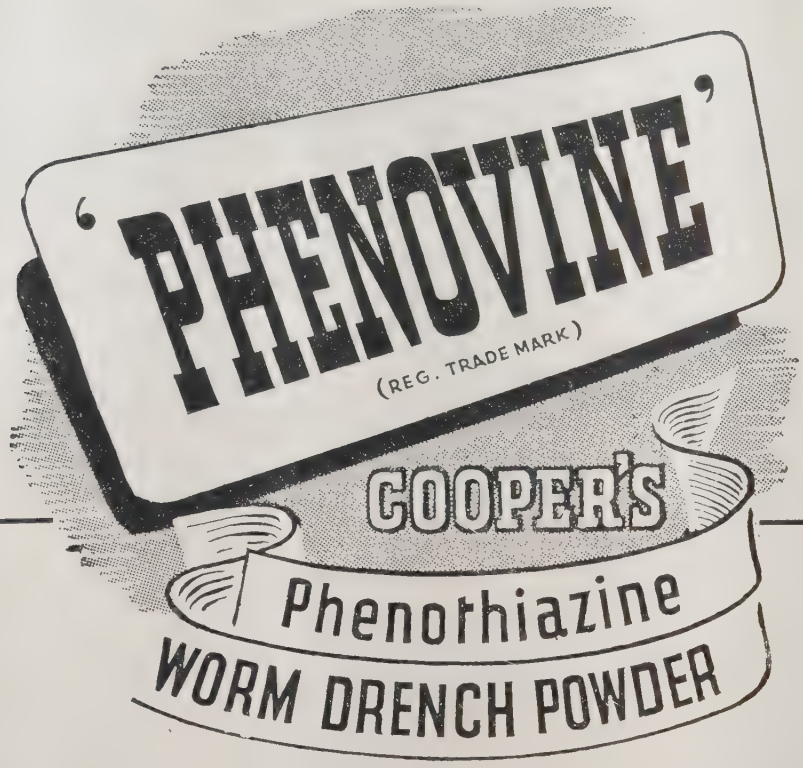

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Veterinary Notes for the Farmer

Ruptures or Hernias in Pigs

PIGS, like other animals, suffer from various hernias which are named according to the positions in which they occur. Thus, there may be observed:

(a) Umbilical or navel hernias;
(b) Inguinal hernias.
(c) Scrotal hernias occurring in males only.

From an economic viewpoint the scrotal hernia is the most important in pigs.

The hernias mentioned consist of protrusions of the bowel from its normal position through a break in the body wall. This break is due to a weakness in the structure of the animal and is looked upon as being more or less hereditary. It is, therefore, a sound maxim never to breed from ruptured sows or boars. Hernias, other than scrotal, are not very serious defects in pigs used for food, as these animals can be raised to the killing stage without detriment to the pork. In the case of the male animal, however, the scrotal hernia becomes of importance, as it interferes with castration. The presence of a testicle in a slaughtered pig often leads to condemnation of the carcase for human consumption, as the pork, especially in the process of cooking, has a most objectionable odour. It is, therefore, advisable to endeavour to completely castrate ruptured male pigs.

How Hernias Occur

A brief outline of how scrotal hernias arise may be of interest, and will help to explain methods of operating to allow successful castration.

During early foetal life the testicles are situated in contact with the kidneys and, as development proceeds, they gradually descend through an opening in the belly wall into the scrotum or purse. In its passage the testicle carries before it a fold of peritoneum, i.e., the thin, glistening membrane that lines the belly wall. In the case of scrotal hernias the structures in the vicinity of the opening are weak, and this weakness allows a loop of bowel to protrude, which ultimately passes into the scrotum alongside the testicle. There are two ways in which the loop of intestine may enter the scrotum.

1. It may travel inside the pouch of peritoneum together with the testicle.

2. It may travel outside the pouch of peritoneum into the scrotum.

This latter form of rupture is rather common in pigs. A scrotal hernia, as mentioned before, interferes with castration and the problem before the farmer is to remove the testicles and at the same time prevent protrusion of the bowel through the castration wounds. There are various methods practised, some of which do not cure the rupture, but this is not of great importance so long as complete castration is performed.

Treatments

First Method.—The scrotum is divided into two compartments by a fibrous partition in the mid-line. In cases where there is only a one-sided rupture, advantage can be taken of this structure in the scrotum as follows:—The testicle on the sound side is removed in the ordinary way and the other testicle is removed through a small opening made in the mid-partition, after which a stitch may be inserted in the second wound. This procedure does not cure the hernia itself.

Second Method.—For this to be successfully carried out, it is essential that the bowel should be inside the peritoneal pouch with the testicle (see above). An incision the full length of the scrotum is made so that the skin is just cut through, after which the bag containing the testicle is carefully dissected out. A piece of sterilised string is now tied at the base of this bag as near the body of the pig as possible, making sure that the bowel has been returned to the belly, after which the bag and testicle are removed.

Third Method.—Castration is performed in the ordinary way. A length of gauze, butter muslin, or similar fabric, after being sterilised by boiling, is passed through the wound made until it reaches the hole in the belly wall through which the bowel has been returned. A piece of No. 8 wire, well rounded at the end and sterilised, may be used to assist in pushing the plug into position. The plug should be of sufficient bulk entirely to fill the track from this hole to outside the scrotum. It will be found that practically only the skin is separating the plug from the belly wall in the vicinity of the groin. It

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is a simple matter to insert a stitch through the skin in this region so that it passes through the cloth in such a way that the plug cannot work out. Forty-eight hours later the stitch is cut and the plug pulled out, no further care being necessary.

This last method is, in the writer's experience, the most satisfactory way of operating on scrotal hernias in pigs and, provided the pigs are operated on at a reasonably early age, there should be few failures. When operating on ruptured pigs it is essential to have them suspended by the hind legs with the head hanging down, otherwise there is a possibility of the bowel being forced out of the castration wounds when the pigs struggle.

Make sure that the loop of bowel has been returned to the belly before removing the testicle.

Strict cleanliness of instruments and person is to be observed, and the pigs should be placed in clean styes or paddocks after being operated on.

T. H. HANKIN, M.R.C.V.S., B.V.Sc., veterinarian, Whangarei.

Answers to Correspondents

Heifer's Injured Teat

"G.A.Y." (Cromwell):

I have a heifer which just after calving jumped a fence and cut the top clean off one of her teats. I tried for some weeks to keep the wound from healing right over and preventing milking of the quarter, but ultimately had to give it up, and so lost the use of that quarter. I wish to know if it will be possible for me, without the aid of a veterinarian, to open that teat again next season, and if so, how could it be kept open until healed?

LIVESTOCK DIVISION:—

It is rather unusual, in a case such as you describe in your heifer, for the teat injury to heal and completely block the opening. If the cow is in milk the flow of milk through the injured areas is generally sufficient to stop healing. In fact, in other injuries to the teat, such as in a wire cut penetrating from the side of the teat to the canal, it is extremely difficult to obtain healing during the lactation period and so stop leakage of milk. In your heifer it is possible that a chronic form of mammitis developed in the injured quarter, this leading to a decreased milk secretion and consequent drying off of the quarter and healing of the opening. However, assuming that this was not the case and that the quarter is normal and healthy, at the next lactation period the secreting tissue will function and the milk produced will dam up in the quarter. The quarter

may then become affected with mammitis, or, without having first developed mammitis, may dry off and remain permanently inactive. I would suggest that you seek the aid of a veterinarian if you wish to have the teat reopened surgically. If you wish to attempt the job yourself, it will be necessary to force the opening with a teat syphon, or first with a needle and then with a teat syphon; and then for a couple of weeks after the operation milk the quarter with a teat syphon. It will be necessary to sterilise the teat syphon by boiling for 10 minutes immediately before each milking. The success of the surgical interference will depend on how much scar tissue has resulted from the original injury, and whether or not the spincter at the end of the teat has been destroyed. An excess of scar tissue may make it very difficult to obtain entry to the teat canal. If the muscular spincter has been destroyed the milk will tend to continually drain from the quarter.

Dogs' Skin Trouble

"L.E.M." (Wakefield):

Do you recommend internal or external treatment only for the following cases of mange in dogs? The older dog, about 7½ years, is a strong-constitutioned animal who developed mange about 6 months ago. He would roll on to his back and rub along the ground; on his loins and hips were small reddened spots, so I applied (rubbed in) a mixture of kerosene two parts and mutton fat one part, melted together, for three days, and then each week or 10 days since, but although he improves for a period there seems to be no real cure. The other dog is about two years younger, and is just showing the first symptoms mentioned above. They are closely related and their fathers developed the trouble at approximately the same age, and others I know of the strain seem prone to it. I am inclined to believe it is more hereditary than contagious, and have known various mixtures of sulphur used, but have not yet seen a cure. The older dog has the hair but thinly left from shoulders to tail, and rather a dry, scaly skin, with the fresh outbreaks exuding a little thin pus. Do you know of any cure? The dogs' quarters are warm and comfortable kennels and food is regularly given them at night, meat when available (say about one-third of the time) and milk at other times and household scraps.

LIVESTOCK DIVISION:—

The condition is probably chronic eczema, since mange is an infectious disease due to a microscopic mite on and in the skin, and is not believed to be present in dogs in New Zealand. Eczema is a stubborn condition to correct, partly because the cause may be hard to locate. Sensitivity to certain foods, fungus, lice and flea infestations, lack of exercise, excess starchy food, or excess protein food, vitamin deficiencies, and in old dogs chronic kidney disease are all in turn blamed for certain cases, as well as internal parasites. Many cases have a tendency to subside during the winter season. I presume you already use the arecolin tablets supplied when dogs are licensed. If not, they should be given, according to directions, since this would get rid of one possible cause, internal parasites. While the diet mentioned appears a balanced one, you could perhaps experiment, as possibly with household scraps too much bread or starchy food is being given. You do not mention exercise, so it is presumed that a reasonable amount is given regularly. As a treatment, a 5 per cent. ichthyol ointment, which a chemist would make up for you, could be applied to affected parts about twice a week. Sulphur internally is a common cure-all for dog complaints, but is mainly a laxative, and unlikely to have any effect on this condition.

Drench for Young Horse

"C.H.," Rehutai:—

Could you recommend a good all-round drench for a young horse that is not thriving as well as he should. He is three years of age and is in fair order, but on the feed available should be in the best of condition.

LIVESTOCK DIVISION:—

Without an examination of the horse it is not possible to give more than general advice. Probably the most common cause of unthriftiness and anaemia in young horses, especially on old country which might be contaminated, is worms. A drench of 1 pint raw linseed oil with 1½ to 2 ounces (depending on whether a light or a draught horse) of vegetable turpentine, carefully given after fasting or about 15

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hours, is a useful remedy for getting rid of the more troublesome worms. Horse should be rested for two or three days after drenching.

Owing to changes in the teeth about 4 years old these may slightly interfere with condition, but nothing much can be done about this. Though there may be abundance of soft grass, this horse might be better for a certain amount of hay or hard feed in addition.

Dyeing Sheepskins

"Homecraft," Whangarei:—

Would you be good enough to publish a recipe for dyeing sheepskins with the wool on. One sees very attractive rugs made of three skins dyed and sewn together, and no doubt many farmers would be glad to know how to do this at home. I can do the curing, but don't know how to go about the dyeing.

LIVESTOCK DIVISION:—

A general statement of the method used in dyeing skins after curing is as follows: Weigh the skins in a slightly damp condition and use the dye up to 3 per cent. of this weight, according to the shade required. Warm just sufficient water so that the skin can be stirred in it to 95 deg. F. Dissolve the dye in hot water and add to warm water, stir well for 15 minutes; if necessary warm the liquor again, and stir for another 15 minutes. The evenness of the colour will depend on the amount of stirring.

The dye used in this process is an acid dye-stuff—if you find difficulty in procuring a dye with an affinity for wool your chemist could obtain it from one of the wholesale houses.

Dyeing of woolly sheep-skins is not a very easy matter, as the wool must be thoroughly washed to remove all grease, and considerable stirring is necessary to ensure even distribution of the dye. The method given above is very wasteful of dye, and home workers have achieved very satisfactory results by laying the skins on a flat surface and applying the dye to the wool only. This usually results in an even penetration of the dye over the wool to sufficient depth to make a satisfactory rug.

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Annual Crops for Pig Feeding

Preparation of the seed-bed for annual crops for pig feeding was considered in last month's notes. Increased pig production is very important at the present time and the production of fodder crops for pigs is being subsidised. Root crops can fill a very important place in pig feeding and it should be the aim of every dairy farmer to grow a few acres of roots and increase his pig production.

Sugar beet, carrots, mangolds, and swedes are the main crops which should be grown, although maize is an important crop in the warmer parts of the Auckland Province. Sugar beet is probably the best crop for pig feeding; it is relished by pigs and may make up to 30 per cent. to 40 per cent. of the fattening ration. It is thus extremely valuable for fattening pigs in the autumn when separated milk supplies are declining. Carrots are also readily eaten by pigs and may form an appreciable part of the fattening ration. Swedes are not really relished, but are very useful for feeding in the winter to maintain store pigs. Mangolds keep well into the spring and are useful to supplement separated milk supplies early in the season.

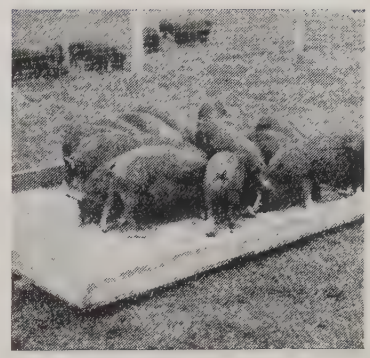
In the warmer parts of the Auckland district maize is a valuable crop for pig feeding; it is a highly palatable concentrate and may be stored until required for feeding, and thus has an advantage over roots, which will not keep beyond a certain period.

Protein-rich Supplements

Roots and maize are all low in protein and must be fed along with some protein-rich concentrate such as meat-meal or separated milk. Each pig of 70lb. weight wintered requires about ¾ ton of roots, 2 bushels of grain, and ½ cwt. of meat-meal.

In feeding pigs 1lb. of grain or 10lb. of roots (5lb. if it be sugar beet) will replace 1 gallon of separated milk. Young growing pigs can deal with less roughage and require a greater proportion of protein in their food than older pigs. Hence sows with litters and weaners entering the winter should receive what separated milk is available, and if this is not sufficient, should have the deficiency made up with concentrates. As pigs grow so do their appetites. When separated milk is plentiful a 40lb. weaner's requirements can be met by feeding 2 gallons of separated milk and ½lb. of concentrates daily. As supplies of milk become scarce, feed 1lb. of concentrates for each gallon of milk short. The concentrates should include meat-meal, more particularly when the separated milk supplied is less than 1 gallon daily. For instance, with ½ gallon of separated milk the following ration will be suitable:—

1½lb. maize, ½lb. meat-meal.



Platform for feeding roots and grain in winter saves food and prevents pasture damage.

Feed Roots Gradually

As the pigs grow, roots can be gradually introduced into the diet to replace still further the dwindling separated milk supplies. Thus when 60lb. weight, usually reached at 3 months, the pigs can be kept going on ½lb. meat-meal, 1½lb. maize, and 10lb. of roots; when 120lb. weight, usually reached when over five months old, feed daily ½lb. meat-meal, 1½lb. maize, and 25lb. of roots. If a plentiful supply of roots is available, feed these to appetite (a pig can consume its own weight in roots per week) in addition to the concentrates shown above. Pigs do better on a varied diet, so that deficiencies in any one food may be made up.

GALLONS OF BOILING WATER in less than 15 MINUTES!

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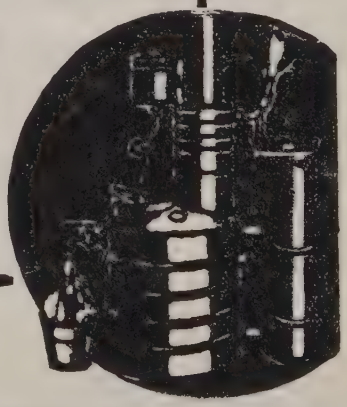

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When ample supplies of separated milk are available meat-meal is not so necessary in the diet, although for young pigs it is particularly useful in assisting bone formation. When feeding only protein-deficient crops such as sugar beet, carrots, pumpkins, marrows, artichokes, swedes, and grains, meat-meal should be added to the ration to furnish both protein and minerals. Some farmers winter stores by feeding them daily on ½lb. meat-meal with free range of the pastures on the farm. Experiments conducted at Ruakura have shown that such provision will barely maintain the pigs and is not sufficient to put them into a condition to fatten readily on separated milk supplies available in the spring.

Diet for Sows

Sometimes pregnant sows after the litter is weaned are turned out to forage for themselves, and may be given, in addition to pasturage, a little meat-meal. This is often attended with disastrous results—failure to breed, abortion, stillborn pigs, and small litters. A pregnant sow requires about 1lb. of meat-meal, 2lb. of grain, and about 30lb. of roots daily. If pasturage is available, dependent on quantity, it may replace all or some of the roots. Both for sows and stores access to good pasture is very helpful in maintaining health.

If farrowings could be timed with surety, the production of winter feed could be reduced considerably. If all the sows on the farm were to farrow in June and December, the amount of winter feed would be reduced to a minimum on most farms and the fullest use made of milk supplies as they become available; the pigs born in June being finished as baconers in January, and the pigs born in December being finished off as porkers or light baconers in June. Thus the greatest number of pigs are on hand when the dairy by-products are at the peak of production.

Unfortunately, many farmers get over the winter supply problem by permitting their sows to produce only one litter per annum. If this practice were discontinued and provision made for sufficient feed to finish off or carry through the autumn litters, our pig production would increase considerably, without increasing our present sow population.

The present production per sow is 8.1 pigs per annum, whereas in 1939 production per sow was 10.5, clearly showing that many of our sows have only one litter per year. A correction of this would have the effect of increasing numbers slaughtered by 120,000 pigs.

Plans and specifications of houses and layouts actually in use in New Zealand are available in the Department's **free** bulletin, "Layout and Construction of Modern Piggeries." Copies may be obtained from the Department of Agriculture, Auckland, Wellington, Christchurch or Dunedin.

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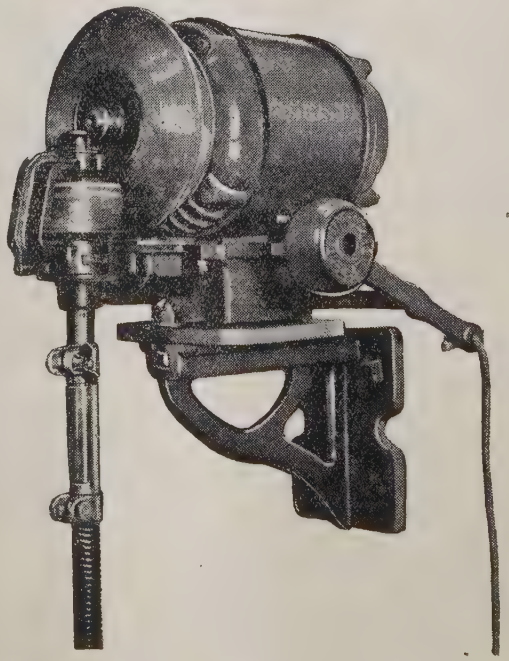

Each stand has a separate motor which drives the gear by means of a friction cone. THE FRICTION SPINDLE IS FITTED WITH BALL BEARINGS ABOVE AND BELOW THE CONE.

TESTS PROVE THAT THIS EXCLUSIVE LISTER FEATURE RESULTS IN LOW BEARING PRESSURES NOT APPROACHED BY ANY OTHER DESIGN.

The plants are fitted with the "tumbling tommy" type of "in and out" gear, thus eliminating the necessity of starting under full load and constant use of electrical switch gear.

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A FRIENDLY WORD IN SEASON. Before ordering spare parts, please make a thorough investigation of what you have on hand—that is, make sure the part or parts you need are not already in the Shed. A little overhaul like this will help us considerably in meeting more urgent demands on our limited stock of "spares."

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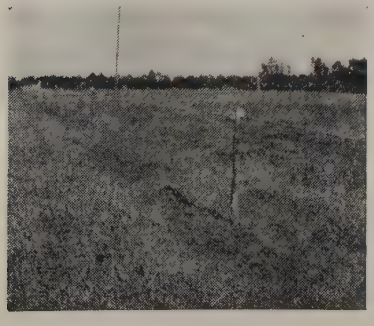
Fencing

THE cultivation of the ground for crops required to increase primary production will entail on many farms the erection of new fences. For such areas the fences need not be of a permanent nature unless the field really requires subdivision for better control of the grazing once it is returned to pasture and for ease of handling. Most average-sized farms with soil of medium to good quality can with advantage be subdivided into at least 12 fields, and it is easy to conceive circumstances in which a somewhat greater number of fields on individual farms would be well justified. Subdivision is essential for fields used for grazing in the flush months when growth is difficult to control, and the better the pasture the faster the growth and the greater need for subdivision into small fields. On the other hand the better the controlling factor, i.e., the larger the number of stock on the farm, the larger the fields can be made.

Types of Fences

The type of fence to erect is dependent on circumstances. Where temporary subdivision is required and sheep only are to be grazed, wire netting is employed on account of its suitability and ease of erection. Where cattle are to be grazed the electric fence of one or two strands of barb wire on stakes or light posts is most suitable, failing which three or four barb wires with three posts to the chain can be used where the cattle are quiet. With pigs two electrified wires may suffice, one about 10 in. and the other 22 in. above the ground.

In fencing in crops one must realise that the fence around them must be fairly strong, because the temptation to break it down is greater than for fences between pastures. In view of the temporary nature of many such fences, one is liable to erect those that while costing little to erect in capital and labour may not accomplish the job they are to perform, namely, keep out stock.



An electric fence for rationing saves grass in the early spring.

"A stitch in time saves nine" applies to fences.

Electric fence for feeding breaks.

The electric fence has proved its worth on the dairy farm as a saver of labour and material, besides giving great service. As a temporary fence it is ideal and for permanent subdivisions it gives good service. For sheep with their protective woolly covering and for wild cattle it has not proved nearly so successful.

With the present shortage of fencing material and its high cost, farmers will not be erecting permanent fences unless there is great need for them. Existing fence lines, however, should be kept in good repair so far as materials available will go. The life of posts can be almost doubled by reversing them before they are too far gone. The common proverb, "A stitch in time saves nine," applies to fences, and by tightening slack wires, replacing staples, battens, posts and stays, the stock will not only be kept in bounds but will be saved from possible injury and fencing material will be preserved.

S. OPPENHEIMER & CO., INC.

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Farm Management

A FARMER is usually a combination of a working manager, book-keeper, and business man, and at this time of the year he should review his operations of the previous year and see if any improvements can be effected.

In regard to general work on the farm he should arrange so that the labour and horses available can be kept going at a steady pace throughout the year. This is not so difficult on a dairy or grassland sheep farm, but on farms where cropping is important the work must be well planned to avoid as much as possible periods when men and horses must be rushed to keep pace with the work and periods of slackness. Having commenced one job endeavour to finish it or at least carry it to a logical point before attempting another.

Book-keeping

In regard to book-keeping and business here are a few points worth remembering. Book-keeping is rendered easier if the majority of cash transactions are paid by cheque and receipts are paid into the bank. A petty cash book is necessary to record minor transactions. Consult a qualified accountant and see that he provides you with a simple means of recording your receipts and payments. Satisfy him that you have a diary system from which you can say with certainty when goods or services came to the farm, also when produce or services went from the farm. If you do these things your accountant should be able to assist you in compilation of an annual profit and loss account and balance sheet for a moderate fee.

On any farm, and particularly on a mixed farm, your books should show casual work done, crop rotations, and record services of cows, sows, and ewes. Let your aim be to purchase early, thus enabling the transaction to be completed well before the articles are needed urgently and thus avoid the rush for necessary articles at a time when they should be in use.

When insuring buildings specify each building and have the company's concurrence with the value put on it. Notify insurance companies within 24 hours of all accidents or fires. Do not let a contractor start work on your property until an insurance policy is produced or you may be liable in case of an accident.

Repairing Damaged Pastures by Feeding Hay

PASTURES depleted by causes liable to recur, such as attacks by grass grub or weed invasion, are probably best restored by feeding hay on such areas, for not only is this method most effective, but also there is no outlay in cash, although it often means extra time and trouble. In combating grass grubs it is effective because

1. It consolidates the soil. These pests are worst and more frequently experienced in light soils.

2. It enriches the soil and the resultant pasture plants are more vigorous and withstand subsequent attacks better.

In combating weeds it is better to cut the weeds close to the ground before feeding hay on the area. Severe damage caused by insect pests and noxious weeds often requires drastic remedies, and so the farmer should not be afraid to concentrate his feeding until the soil is churned to mud. The more trampling that occurs the less the recovery of the weeds and generally the better the grass and clover establishment.

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Top and bottom wire 10 gauge.

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SPECIAL 830 DOCKING NETTING, 8 wire, 30 inches high in 5 chain and 2½ chain rolls.

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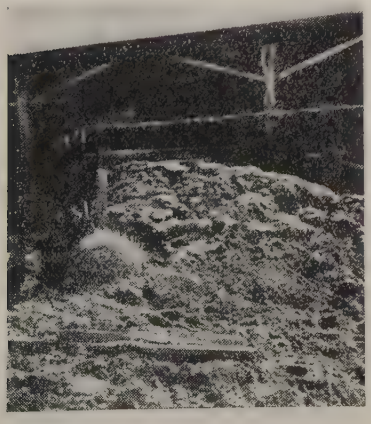
Conserving Farmyard Manure

IN New Zealand attention is frequently drawn to the loss that occurs through the non-return to the soil of animal manure and urine. This loss occurs through faeces and urine voided in cowsheds being left lying open to the weather, when the valuable soluble and volatile constituents soon disappear. On many farms these heaps are distributed every few months, and on some farms it might be said that they are never distributed, but merely left to slowly decompose and disappear into the surrounding soil and atmosphere.

While the loss occurring through the latter practices is freely admitted

Shed washings have improved the clover content of pastures.

the difficulty of disposal has been the chief obstacle to the proper utilisation of this manure. There have been, however, a few dairy farmers prepared to take the time and trouble to make the fullest possible use of this material. They have constructed tanks to receive the shed washings and have undertaken to distribute the material by using water carts, usually home made. The shortage of fertiliser during war years has been an additional incentive to this practice.



Don't waste cowshed manure.

Surprising Results

The results have been better than were expected, probably because they were expected to be similar to those received from use of the solids shovelled from dairy shed floors and left in heaps to weather for some time prior to distribution. The results have been somewhat surprising in that the mineral and probably the minor elements appear to have exerted a greater effect than it was presumed they would. In districts where mineral deficiencies were great the shed washings, together with topdressings of phosphate and lime, have improved the clover content of pastures to a much greater extent than have only phosphate and lime applications. Hence the application of shed washings is proving particularly valuable on pastures that do not respond to ordinary topdressing practices. In addition, of course, is the expected temporary improvement in grass growth through the nitrogen content of the shed washings.

Horse manure from stables is generally fairly well utilised, since it is usually spread immediately every time the stable is cleaned. There is, however, a loss of urine which could be collected in a receptacle and spread in the same manner as dairy shed washings.

—J. E. BELL, Acting Land Utilisation Officer, Wellington.

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for Sheep Dips, Pig Pens, etc.

Why not build yourself a really efficient sheep dip in clean, permanent concrete? Or a modern cow yard or piggery? Instructions on concrete work on the farm will be sent on request. State what you wish to make. Wilsons N.Z. Portland Cement Ltd., South British Insurance Buildings, Shortland Street, Auckland.

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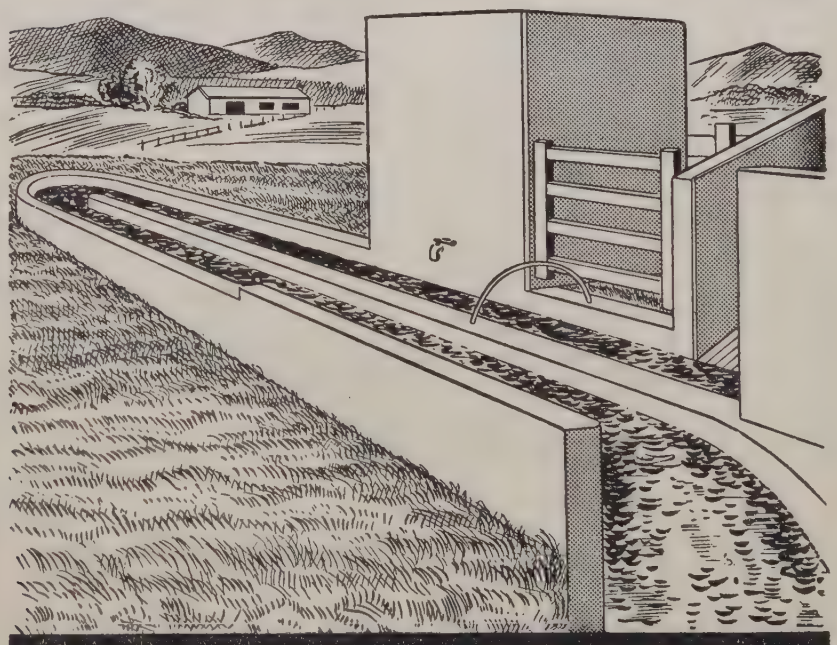

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Orchard Notes

Work Which Means Efficiency

ON the well-managed orchard there is no real slack period; only adverse weather conditions should be allowed to interfere with outside work. Wet days can always be profitably spent in cleaning up the packing shed and sizing machine, and reconditioning picking boxes and bags where necessary; the cleaning and oiling of implements which are in regular use, making up new cases, and the numerous jobs which require attention prior to the coming season all help to build up the efficiency of a well-run orchard.

The end of winter pruning operations should now be in sight, if not already completed, and prunings gathered up and burnt, together with any reject fruit or rubbish from the previous season.

Orchard sanitation and hygienic methods in and around the packing shed and orchard cannot be too strongly stressed, as from an economic viewpoint the elimination of all sources of infection of both fungous diseases and orchard pests will ultimately reflect on the cost and efficiency of the spraying programme to be applied.

Where conditions are lax breeding places are established in the very region where time, labour, and money are being expended to control these same diseases. It is not an uncommon sight to see cases containing reject and diseased fruit stacked up awaiting disposal; very often these are left far too long and in the case of codling moth the grub has left the fruit and selected its harbouring place ready for emergence in the following spring.

Early Sprays

The thorough mixing and efficient application of all sprays are important; their application is made to protect the trees from attacks by pests and fungoid diseases and the chemical compounds employed, when mixed properly, are toxic to the parasite without being injurious to the tree. Fungicides are applied as protection against fungi and insecticides against insect pests. Both, however, are applied in solution or suspension by mixing with water, which, when evaporated, leaves the fruit and foliage covered with minute particles of chemical substances applied, dependent on the fineness of the spray and the thoroughness with which it is applied. The right type of nozzle giving a fine, misty spray should be used, and all tree parts should be thoroughly soaked without going to the extreme of over-spraying and waste of material.

The first or dormant sprays are applied mainly against scale insects and eggs of red mite; for this purpose red oil at a strength of 5 per cent. dilution is usually applied.

As previously recommended an early application of Bordeaux mixture 5-4-50 when the fruit buds begin to swell is essential for control of peach leaf curl and other stone fruit diseases.

In addition to spraying for control of orchard diseases and pests, supplementary work by means of elimination of sources of infection will greatly assist in control. Pruning out and burning of diseased wood or parts badly infected with San Jose scale which have been missed in normal pruning operations, also scraping the rough bark off trees for the purpose of destroying codling moth grubs will assist in keeping under control diseases and pests which prove costly to eradicate once they become established. Whatever supplementary measures are taken, it must be remembered that constant and efficient spray applications must not be neglected if adequate disease control is to be obtained.

Manure Applications

As annual crop production proceeds plant foods, the elements essential to plant life, are drawn upon by the tree from the soil in proportions depending upon their availability in the soil, the crop, and the conditions of growth.

Applications of the three main elements, viz., nitrogen, phosphates, and potash, should be made, after a careful study of the requirements of individual trees, in the form of a balanced manure suitable to all conditions, if efficient production is to be maintained. The productivity of the tree and the quality of the fruit as well as its storage life may be adversely affected by faulty applications of

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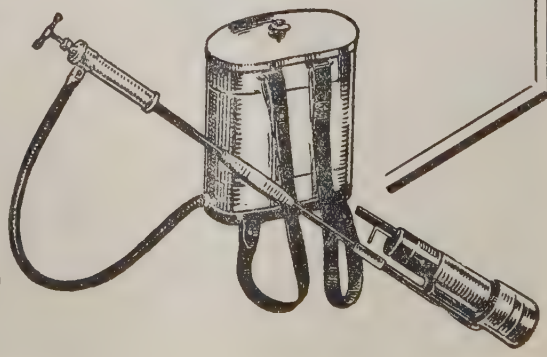

manures, apart from the waste of money and effort on the part of the grower.

Deficiency Effects

The following are some of the chief symptoms observed when trees are deficient in nitrogen, phosphate, and potash:—

Nitrogen: Stunted growth, yellowish-green leaves, early defoliation, poor fruit set, and reduced root system.

Phosphates: Poor growth and root action, dormant buds are apparent, and bud burst is usually delayed.

Potash: Lack of potash usuall does not show in restricted growth as does lack of nitrogen and phosphoric acid, but renders the leaves susceptible to the characteristic scorching along the margins and early defoliation from the tips of the shoots on which marginal leaf scorch has been pronounced.

The chief functions of these most important plant foods when applied are as follows:—

Nitrogen promotes growth, builds up framework of plants and trees, and gives strength and solidity to branches; it darkens the green of leaves and enlarges their surface area if applied with caution.

Phosphates stimulate root action and promote fruitfulness and early ripening.

Potash increases quality and store of sugar, starch, etc., imparts tone and vigour, and forms woody fibre.

Balanced Fertiliser

The balanced fertiliser is a proportion of each of the three above main elements, the quantity applied per tree or per acre depending on soil type, tree growth, condition, production, and situation, in conjunction with pruning methods adopted and soil fertility.

Phosphates and potash should be applied early enough to allow them to be turned deeply into the soil when ploughing takes place.

Nitrogen is better applied just before fruit set, when the maximum availability is desired.

Orchard Cultivation

Adequate orchard cultivation is as important as any other orchard practice, its advantages including the following points:—

1. **It prevents evaporation by reducing the conductivity of heat, and also by breaking the capillary tubes in the soil, through which the subsoil moisture escapes.**
2. **By letting the air into the soil it enables the bacteria to breed quickly and extract from the air the nitrogen which is so necessary to plant life.**
3. **The broken surface enables the moisture in the air to circulate freely through the soil and much of this moisture is absorbed and held by the ground when heavy dews take place.**
4. **It kills the weeds, which use a large percentage of the useful salts in the soil.**

Green Manuring

Excessive losses through leaching can be avoided by growing crops which take up the surplus nitrogen and return it to the soil in organic form when they are ploughed under. A leguminous cover crop is more desirable, as it increases the total nitrogen content of the soil, having drawn to some extent for its growth on the ultimate source, atmospheric nitrogen. The benefits of humus in the soil are well known; it improves the texture of soils generally, but even of greater importance is the fact that humus is the common food for soil organisms, and for this reason the supply must be maintained if nitrification is to be rapid. The value of maintaining humus in the soil is obvious and it can be done by growing green crops and ploughing them under at the correct time during the spring when the maximum head of green growth has been reached.

Some of the important functions of green manuring are:—

1. **Aeration of the soil, which is beneficial to the work of soil organisms.**
2. **The supply of food and energy to soil bacteria.**
3. **The retention of soil moisture in lighter soils.**
4. **Improvement of soil texture and therefore tilth.**
5. **The binding of soils, thus resisting erosion.**

Applications of Lime

Although lime is not a fertiliser in the generally accepted term, its application plays an important part in soil improvement; it makes available for the nutrition of the tree some insoluble forms of nutrient matter, especially in compounds containing phosphorus and potassium, and therefore releases necessary nutrients which are fixed or locked up in the soil.

It also is a corrector of soil acidity, brought about by the decomposition of vegetable matter in sour or wet soils. In this way it increases the valuable activity of soil bacteria, thereby benefiting the tree.

Further it has a marked effect on the physical condition of the soil, rendering clayey soils less sticky and more friable, and making cultivation easier. On light, sandy soils light dressings tend to bind the particles together, thereby improving the water-retentive capacity of these soils. Liming need not be conducted annually; an application of 1 ton per acre of carbonate of lime every second or third year is the usual practice.

Where reworking trees at a later date is contemplated, care should be taken to see that the scions, which should already have been carefully selected from approved trees, are heeled in in a suitable trench in a cool position to prevent drying out.

Planting

Where soil conditions are suitable planting should proceed after the soil has been thoroughly prepared. Care and attention should be given to alignment, depth of planting, and trimming of the roots. A light application of blood and bone equivalent to ½ lb. per tree mixed with the loose soil in the hole will be of benefit. After planting the soil should be firmed around the roots and the tops headed back to the desired height and shape. Give the young trees as good a start as possible, and where necessary provide protection against damage by hares and other vermin.

—R. E. BINFIELD, Orchard Instructor, Hastings.

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Railways Take The Strain

Of all the indispensable parts of our war effort, Transportation is one of the most far-reaching. It enters every stage of production; it controls the usefulness of our fighting forces and the great army of men and women in our war production plants. The Railways are the main arteries of transportation in this country and because of their efficiency and reliability in handling the greatest traffic volume in history, the pulse of New Zealand is strong, and our war effort distinguished by a condition of enough and more, when and where wanted.

The Pull Is For Victory

Preparations for Spring

WINTER and early spring months provide most suitable conditions for spread of brown rot. Protective cover spraying should have been done in May or June to prevent spores from gaining entry to fruit or foliage tissues. Nevertheless, if signs of the disease appear, a thorough spraying of the trees with Bordeaux mixture at 3-4-50 strength, even at this late stage, will do much to hold infections in check, but do not delay after the first signs of brown rot appear.

Picking

Citrus fruit harvested during the wet winter months is in a condition very susceptible to injury. Special care is necessary to avoid rough or careless handling at any stage of harvesting or transport to assembly depots.

Bud-wood

Collections of bud-wood for spring reworking may be made during winter and the sticks stored until required. During winter suitable wood of the previous autumn growth will be well matured, but the buds will not have developed young shoots; whereas, if collection is delayed until the buds are required, many buds will have made short growths and become unsuitable for use. Consequently, much more wood will be required to provide the required numbers of good buds.

Bud-wood should be tied securely into bundles and carefully labelled. The bundles may be stored for long periods in sawdust, sand, or sandy earth, either in boxes or in the soil. They must be kept moist, but definitely not wet, and they must be stored in a cool place to delay growth of the buds. The bundles should be placed horizontally or with tops of the sticks downwards. Well-developed wood of the previous two growths is most suitable, and the middle buds on these sticks are the most likely to succeed.

Spring Fertilisers

While lime is not in itself a fertiliser, a dressing of about half a ton to an acre every second or third year has certain beneficial effects. Soil which is heavy or inclined to be sour will be improved in texture, while acidity will be reduced, by an application of carbonate of lime. Such commercial fertilisers as sulphate of ammonia and superphosphate tend to increase soil acidity, which lime will counteract.

SEASONAL WORK.

Keep harvesting of lemons up to date.

Watch for signs of brown rot infections.

Prepare for spring plantings.

Plan spring applications of fertilisers.

Commercial Fertilisers

These fall into two main groups, chemical and organic, which in turn comprise the three main plant foods, nitrogen, phosphates, and potash. While it must be conceded that organic manures are of great ultimate value to the soil, there is yet a place for chemical fertilisers used with discretion; in fact, without a major change in common orchard practice, it is very difficult to supply the plant food required by bearing trees without making use of chemical fertilisers, especially under existing conditions of shortage of commercial organic fertilisers.

Cultivated soils fed on an unvaried diet of chemicals very soon show signs of poor physical condition, and fail to produce satisfactory crops. Therefore, every endeavour should be made to supply the land with organic plant food by the use of cover crops and such mulching material as may be available.

Of the commercial plant foods blood and bone or bonedust are probably the most generally useful, as both provide considerable proportions of nitrogen with enough phosphates to maintain supplies of this element in the soil, though they have comparatively little potash. These fertilisers are organic, but are also rationed and may be used only to the limited extent to which they are available.

Of the supplementary chemical fertilisers nitrogen is the one chiefly required by citrus trees, and sulphate of ammonia the best commercial form to use. Smaller quantities of phosphates are required to maintain balance of plant food, and they may be supplied by using the limited quantities of superphosphate now available. Sulphate of potash preferably, or muriate of potash, will supply the needs of this element.

The spring application of fertiliser, being used at a time when the trees require energy to produce growth, should include a major part of the year's quota of quickly available nitrogen, and smaller proportions of phosphates and potash, which should be used in greater quantity in autumn when strong growth is not desired.

Therefore, having arranged for such fertilisers as may be obtainable for the year, distribution should be worked out to provide a mixture with a relatively high nitrogen content for spring application, while reserving larger quantities of the slower acting materials for autumn.

Smaller Spray Mixings

For the benefit of readers who have only small numbers of trees to spray

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Orchard Diseases

THE results of investigations carried out by the Plant Diseases Division are embodied in the Department's **free** bulletin No. 161. This bulletin deals with the various sprays in common use, their dilution and combination, and sets out spray schedules for apples, pears, stone-fruits and citrus fruits. The treatment and disinfection of tree wounds is also explained. A copy of this informative **free** bulletin may be obtained from the Department of Agriculture at Auckland, Wellington, Christchurch and Dunedin.

during the coming season, the following equivalents are set out, showing the main recommended spray quantities for use on commercial citrus orchards, with corresponding proportions needed for 4-gallon mixings:—

Commercial Proportions:	*Kind of Spray:*	*Quantities Required for 4 Gallons Water:*
3—4—50	Bordeaux mixture	4oz. copper sulphate (bluestone) 5oz. hydrated lime
3—100	Summer oil	1 pint summer oil
1½—100	Arsenate of lead	1oz. arsenate of lead
1—800	Nicotine sulphate	1 teaspoonful of nicotine sulphate

Materials required for smaller quantities of water can readily be worked out from the above figures.

—*I. L. NOTTAGE, Orchard Instructor, Auckland.*

Cool Storage Notes

Pre-Cooling and Storage of Stone Fruits, Pears and Apples

DURING seasons when rainfall in the late spring and early summer is followed by warm weather and the consequent high relative humidity brown rot is found to be extremely difficult to control. Under these conditions heavy losses may occur during harvesting, storage, and transportation right through to the point of consumption, as the disease continues to develop on the fruits during and following storage.

The provision of pre-cooling and storage facilities of sufficient capacity for each grower's requirements should be an acquisition, as when the fruit is harvested at the correct stage of its maturity it may be maintained in that condition and greatly assist towards ensuring the fruit reaching distant markets within the Dominion while it is still in good condition for consumption.

When the pre-cooling of stone fruit of good quality on the orchard directly following harvesting has been accomplished, the transportation of the fruit still under refrigeration would greatly assist in ensuring that its condition on arrival at its destination will be such as to withstand the time necessary for it to reach the consumer and repay the producer for the added expense and labour involved. The use of ice-bunkered railway wagons would be of great value in maintaining the condition of these highly perishable fruits, and also in providing against the detrimental effect of unavoidable delays which may occur during transit.

Temperatures Required

When erecting refrigerated cool-storage facilities on their properties orchardists would be well advised to keep in mind the refrigeration requirements of the fruit to be stored. The temperatures required for fruit storage range from 29 degrees to 38 degrees F. and relative humidity from 85 per cent. to 90 per cent. Pre-cooling temperatures for stone fruit are 36 degrees to 38 degrees F., and the capacity and design of the refrigeration plant and cooling equipment should be such as to deal with each grower's maximum demand for pre-cooling to reduce the flesh temperature of the fruits to 36 degrees F. in from 36 to 48 hours.

The design of the cooling equipment should provide for the required amount of cooling pipe surface being evenly distributed above the stacked fruit, together with an even distribution of the forced air circulation, which should be delivered across the ceiling pipe surfaces with a positive suction underneath and in a downward direction through the stacked fruit. This design of cooling equipment, with ample, well-distributed cooling pipe surface installed, will give even cooling throughout the stacked fruit and relative humidity values most suitable for fruit storage.

An additional advantage of the above arrangement is that the cooling pipes in open-spaced formation above the stacked fruit are maintained at their full efficiency, as the pipes are defrosted by the warmer air near the ceiling of the chamber. For pear storage the occasional defrosting of the pipes will be necessary when storage temperatures of 29-32 degrees F. are maintained; but even then the defrosting should be necessary only about two or three times during the season.

The following guide will be helpful:

1. With a flesh-temperature thermometer test the flesh temperatures of fruit in the centre of the cases in various parts of the chamber and record these temperatures for future reference.
2. As far as practicable harvest and place each day's picking of fruit in the chamber by midday of the same day.
3. Fruit picked late in the afternoon should be open stacked in a cool position and placed in the cool chamber the following morning. This procedure will reduce the heat load on the refrigerating plant, as frequently the cool atmosphere during the night will reduce the temperature of the fruit by 10 to 15 degrees F.
4. Ample air spaces must be provided all around the stacked fruit cases, as the air circulating in the chamber is the only medium by which the refrigeration is transferred from the cooling pipes to the stacked fruit. Floor battens are necessary under the first case, in order to allow free air circulation in the chamber and to remove the heat coming up from the floor insulation.
5. Stone fruits such as Thiele cling peaches, nectarines, and apricots, and plums such as Grand Duke and President being held for a period of storage require flesh temperatures as low as 32 degrees F. Therefore, the cooling equipment installed should be designed to maintain this temperature with the minimum amount of attention to the defrosting of evaporator coils.
6. It is essential that pre-cooled fruit for transportation in insulated railway trucks should not be loaded in the same truck with hot fruit.
7. Insulated or ice-bunkered railway trucks for pre-cooled fruit should be loaded as quickly as possible and the door of the truck sealed immediately.

—*A. A. POWELL, Cool Storage Officer, Wellington*

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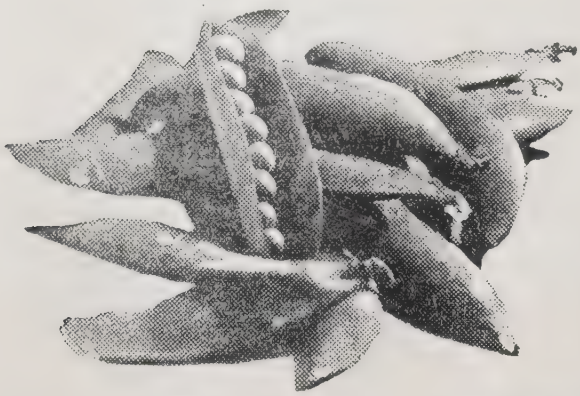

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Guide for the Home Garden

Work for August: The Coming Season

DURING August a considerable amount of clearing of vegetable crop refuse will require attention in the garden. When this work is being carried out and preparations are being made for the utilisation of garden refuse in a compost heap particular attention should be given to the material selected for composting and the methods of composting to be adopted. As, however, the generation of sufficient heat within the heap is necessary to destroy disease-producing fungi and bacteria, crop remains which may be affected with fungoid or bacterial disease should not be saved, unless the destruction of these harmful agents is certain. Diseased crop residues are best destroyed by burning, and the ashes saved, before being wet, for subsequent application to the garden area.

Dig in Green Manure

Hedges may require cutting, the tender green trimmings being saved for composting. Green manure crops should be dug in so that they may be decomposed, or mainly so, before new-season crops are planted on the freshly-dug area. This will specially apply to parts of the garden where a non-leguminous green crop is being grown. Where a legume, such as lupins, is growing the longer this crop can be allowed to grow without undue interference with the garden plan the more nitrogen will be gathered by the roots of the plants which, when the crop is dug in, will add considerably to the soil fertility of that part of the garden.

Where seedlings may not be quite ready for setting out it would be an advantage to have the soil turned over and partly raked down. Weeds which have germinated should be destroyed before the garden vegetable crop is planted. This will considerably lessen the subsequent labour of hoeing for weed destruction during a busy period.

As conditions during August change from winter cold, and the soil becomes easily workable, home-gardening activities will begin in earnest, and it should not be overlooked that the main and most reliable source of vegetable supplies must still be the area which one can find it convenient to cultivate at or near the home.

Summer Cabbage.—As indicated in the July issue of the Journal seed of Golden Acre should be sown so that good plants may be ready for setting out during August. This splendid nutty-flavoured cabbage is one of the most reliable croppers of the brassica family, which, under ordinary cultural conditions, will rarely fail to give satisfaction. It is important at this particular season that good, well-rooted, stocky, and properly hardened-off plants should be set out.

If, for some reason, plants have to be bought, it may be an advantage to set them out either in a box, which should not be less than 4½ to 6in. deep or in a sheltered, sunny part of the garden, allowing 1 to 2in. each way between the plants. It is not necessary to apply any fertiliser to the seedlings; but where they are planted in the open garden the part should be well drained. In two weeks the young plants will have become stocky and when dug out—not pulled out—will be observed to have developed a splendid new root system which will enable them to become well established in the minimum of time.

Rhubarb.—Roots which may have been dug out during June and are being kept for later division should be looked over towards the end of July for indications of development of bud movement. In healthy, vigorous roots the buds will show up in blunt protrusions resembling one's thumb, and will be seen to emerge with fleshy-pink colouring from their protecting cover. As soon as these buds become prominent the roots can be divided, and as much of the old root as is practicable should be allowed to remain on each bud.

When planting the buds should be set not less than 1in. below the garden soil level. Plenty of animal manure or well-made compost cannot be used to better advantage on any other vegetable garden crop. No stalks should be pulled during the first season from newly-planted buds.

Onions.—From autumn-sown seed plants should be ready for setting out during late July or August. It is from these plants that supplies may be expected to store in good condition. Bulbs from spring-sown seed should not be expected to remain in excellent condition for any prolonged period.

As the crop is planted closely, bonedust may be broadcast at the rate of 3 to 4oz. per square yard over the area to be used. If convenient, this should be done two or three weeks before planting starts, and the manure worked into the soil immediately after the application is made. Twelve inches may be allowed between the rows and 3 to 4in. between the plants in the row. Many commercial onion-growers set five plants to each foot of row.

For spring-sown seed or for ordinary spring onion (White Lisbon) growing, 2oz. superphosphate should be added to the bonedust recommended above, and a heavy dressing of wood ashes applied to the bed. The latter may be applied after the plants have been thinned.

Shallots.—As soon as the soil can be freely worked the bulbs may be

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planted. These will respond best in soil which has been dressed with stable or farmyard manure during autumn. If this has not been done, blood and bone manure, 3oz. per square yard, should be worked into the soil, after digging and before planting. Rows are generally 12in. apart and spacings of 8in. allowed between the bulbs in the row. The "sets," as they are sometimes called, are merely pressed into the soil to sufficient depth so that they will remain upright; rooting will start almost at once.

Properly cared for, this crop will fill in the gap between the end and the beginning of the two main crops.

Cauliflower.—Provided recommendations which were made in the June issue of the Journal for sowing seed were followed, cauliflower plants for harvesting during December should now be ready for setting out. The first favourable opportunity may be taken advantage of for planting, as retaining the seedlings too long in the seed-bed is detrimental to the production of high-quality heads.

A rich, well-drained soil is necessary for this crop, and a mixture of 1 part sulphate of ammonia with 3 parts superphosphate, by weight, distributed at the rate of ½lb. to each 9ft. of row will be a suitable fertiliser. Two or three handfuls of wood ashes applied around each plant will, in the absence of potash, provide this necessary plant food. Rows may be spaced 24in. apart and 18in. allowed between the plants in the row. For planting this early crop a sheltered part of the garden should be selected. The plants will respond to good treatment, but neglect in any respect may easily prove disastrous.

Lettuce.—Plants from early-sown seed can be set out in most districts from mid-July onwards. In cold and wet locations raised beds will be an advantage.

Potatoes.—In districts which are comparatively free from late frosts, or where one is disposed to take risks, preparations may be made for setting out seed for the early crop. Before deciding the question of early planting due consideration should be given to the proper utilisation of available quantities of fertilisers and potato seed. While sufficient supplies of these may, for the present, be at the home-gardeners disposal, every effort should be made to ensure their being used to best advantage.

For early planting uncut seed is best, and, generally, more fertiliser is required, while the crop may well be placed in the luxury class. For a main crop an equal quantity of seed and fertiliser will give a better economic return. Between the time seed for an early crop might be planted and seed for a main crop should be set it may be possible to take a crop of lettuce or spinach from the area it is intended to use. These economic factors should be considered when planning the garden production during the coming season.

Asparagus.—The asparagus bed should be maintained in a condition entirely clear of weeds. This is essential in view of development in early spring. As soon as the first shoots appear above ground a dressing of nitrate of soda, about ½oz. to each well-developed root, will stimulate the plant in its seasonal production. This vegetable should be heavily fertilised immediately after harvesting the crop is finished and before the later spears are allowed to grow. Fertilisers of the ordinary kind applied at present will not serve any useful purpose.

Leeks.—Although the crop of leeks will be getting thinned out by digging for kitchen use, the remaining plants should not be neglected; liquid manure applied weekly will be more beneficial to them in their present stage of development than bulk fertilisers applied in dry condition.

Spring Cabbages.—A well-grown bed of spring cabbage should, by the middle of August, be producing some heads, which, although not fully developed, will be usable as a welcome change from root crops. Coming into spring, after winter rain, a few of the bottom leaves may be noticed to have changed to a yellow colour. When this takes place the leaves should be removed by cutting them off close to the main stem. Placed in a compost heap which is operating by fermentation the fungus responsible for the disease will be destroyed by the consequent high temperature. If the compost is not being prepared in this manner, it is advisable to burn the diseased leaves after removal.

Liquid manure may be applied to the undeveloped plants during the early part of August; a pinch of nitrate of soda is better. Later applications will have a tendency to prevent hearting and to produce a bunchy, leafy plant.

Brussels Sprouts.—In the absence of spring cabbage the green, leafy tops of Brussels sprouts can be used as a substitute for other green vegetables. The top, however, should not be cut before all the sprouts have been removed from the plant.

Tomatoes.—If the necessary quantity of soil for sowing seed and growing the season's plants has not been sterilised, this matter should be attended to without delay. It is not a difficult or costly operation, as reference to past Journals will show. In view of the amount of seed-borne diseases prevalent at the present time seed disinfection may also be advisable. Corrosive sublimate, known also as mercuric chloride, is commonly used for this purpose. Tablets may be purchased from most chemists, and, for tomato seed, one is dissolved in 3 pints of hot water. When the water cools the seed is soaked for 5 minutes and then rinsed thoroughly in cold water running from a tap. The seed may be sown at once or properly dried and stored for future use. Only glass or earthenware vessels should be used for the purpose.

NOTE.—Corrosive sublimate is a deadly poison, and, after use, should be poured into a hole in the garden.

—D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.

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Manures

are vital to the success of your garden crop. A free bulletin on "Manures and Manuring for Garden Crops" may be obtained from the Department of Agriculture.

The more deeply the gardener thinks the greater the concentration upon his objective and the more economically and advantageously he can work. There is no conflict between theory and practice: the one is, or should be, the handmaiden of the other.—D. K. Pritchard.

DON'T forget that eternal vigilance, which is the price of liberty, is the price which must be paid for a winter crop of green vegetables.

DON'T decide to "do it to-morrow." The pests are working overtime.

DON'T assume that fertilisers applied in large quantities will produce good crops without thorough cultivation.

DON'T blame poor germination results entirely on having been sold inferior seeds. Try to improve the method of sowing and the facilities for germination.

DON'T put off till tomorrow what can be done today. Procrastination is the thief of time.

DON'T neglect seedlings. If the seed is worth sowing the plants are worth protection.

Seasonal Work for Beekeepers

Producing Honey in "Cogs"

FOR a number of years past an Auckland apiarist, Mr. J. B. Ballantyne, has been producing comb honey in an unusual form called "cog" honey. The term "cog" is applied to the container in which the honey comb is produced and marketed. The name originated in, and rather curiously seemed to be limited to, a certain small area of Scotland, not very far from the City of Glasgow.

August 12 in Scotland is a date famous for the opening of the season for shooting grouse, a bird that thrives on young heather. On or about this date beekeepers move their bees to the moors for the purpose of harvesting honey from this source. The bees are moved at night, often many miles, either by lorry or horse-drawn vehicle, usually arriving at their destination in the early morning. The principles of the production of "cog" comb honey in New Zealand, particularly from manuka, are much the same as for heather honey, and both are very suitable types for the purpose, being dense, thixatropic, not given to ready separation from the comb by centrifugal force, nor inclined to "run" when the comb is broken or accidentally damaged.

Construction

"Cogs" are light wooden boxes, the outside measurements of which are 7in. by 9in. by approximately 3 1-8in. depth constructed of ¼in. thick timber used in the rough just as it comes from the saw-bench. The top of the box has four 7-8in. diameter holes so placed that they are exactly midway between the wax foundation strips or "starters," which are from ½in. to ¾in. in depth and nearly as long as the box is wide inside. While it is necessary when producing section honey to have a white and polished finish to the woodwork, it is not so necessary in "cogs," but it is important that the boxes be constructed accurately.

Starters are preferable to full sheets of foundation, as they are not so likely to break down under the weight and heat of the clustering bees. Thin super is the better foundation to use from the consumer's point of view, but medium brood gives the beekeeper most assurance of success in production.

Steps in Production

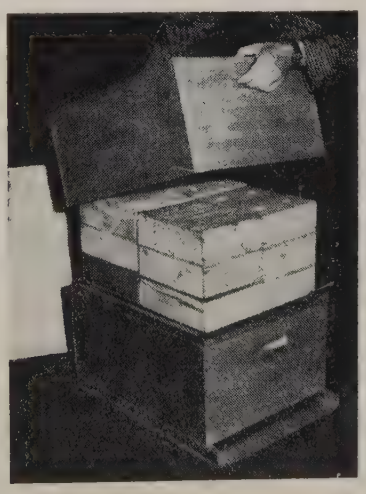
Twelve "cogs" is a good output for one hive and can be accommodated inside a full-depth super. In good seasons the best hives complete up to sixteen "cogs." Strong, single-storey hives headed by young queens are used when producing "cog" honey on a manuka honey flow. Honey harvested in this manner can also be successfully undertaken in clover districts, but the consistency of clover honey makes it a messy job and breakages are frequent. It would also be advisable to allow the queen the use of two brood chambers in these areas.

Queen excluders of the wood and wire type must be used above the brood nest, otherwise the queen may enter the "cogs," many of which would be spoilt with drone brood.

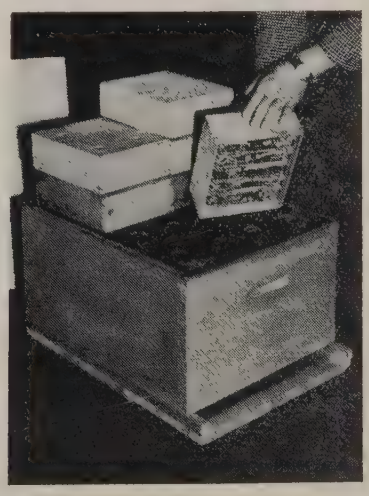
The bees usually commence to store honey in the central part of the lowest group of four "cogs," and it is not advisable to interrupt their work by too early interference with the hive, but when by looking through the four access holes in each of the four "cogs" of the top layer (or group) it is observed that large numbers of bees are busy there, then the super may be lifted up and the sides and ends of the assembled group exposed. If the flow has been good the bottom four may be finished and ready for removal. This is done by gently prising up a corner of each "cog" in the top layer which with a slight twist or two will break away from any wax attachments. They should be gently set down just as removed from the hive, and not jarred or turned upside down, as this would disturb the cluster of wax-building bees and the new soft wax would fall sideways. The intermediate layer may be removed next.

The full extent of the bees' progress will be evident at this stage, and also whether the strain of bees used tend to join the combs down on to the top of the "cogs" underneath, or to finish them flat and square, as desired, with a

Hive closed down with 12 cogs in upper super.



Contents of hive shown in position when super is lifted.



"Holey" board (excluder beneath) and finished cog as it would appear on hive.

clear bee space and with no attachments. If, however, the bees have attached the comb to the lower "cogs," it will be necessary to separate them by drawing a length of frame or thin steel piano wire under each "cog" before they can be lifted off to avoid tearing pieces out of the combs. Should the bottom group of "cogs" be finished, they can be set aside, but it is often necessary to turn the "cogs" around to induce the bees to complete the combs now turned to the centre from the four outer corners of the hive. If the flow appears to warrant it, a new set of four "cogs" may be added on top of the remaining groups to replace those removed. When only a few hives are being worked they could be given more frequent attention and a single set of "cogs" only put on hives in the first instance. To dispense with unpleasant dripping of honey where attachments have been cut with the wire all the hives requiring this treatment could be attended to at the same time and left for about an hour, during which interval the bees would clear up the leaking honey.

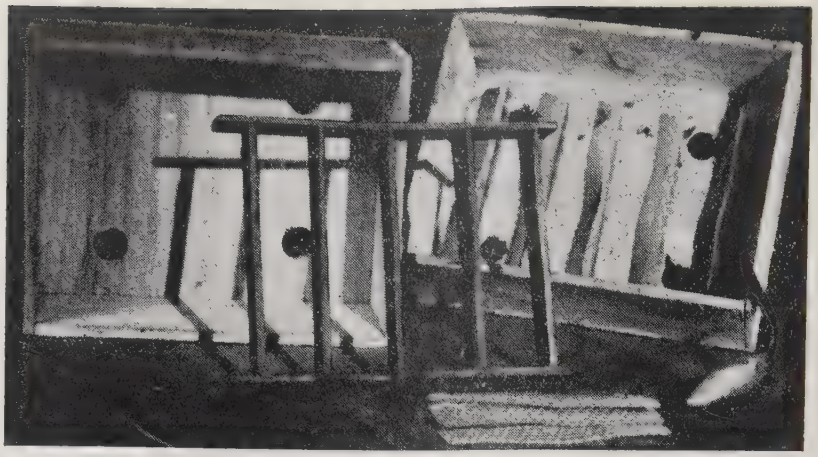
The "Holey" Board

A "holey" board is a necessary adjunct to "cog" honey production. It rests on top of the queen excluder, as illustrated. Its function is to provide a flat, even surface to facilitate wire drawing, when necessary, and also limits and directs bee traffic up and down to definite points, which assists in inducing the bees to finish off the "cogs" with a clear bee space and a minimum of brace comb. An important point to remember is that well-finished "cogs" are influenced by having the "holey" board level and the hive itself level both front to back and across. When a hive is off-level the bees produce burr and brace, as well as crooked combs.

There are sixteen 1¼in. diameter holes in the "holey" board, which are so arranged that each "cog" rests over four of them approximately in line with the holes in the base of the "cogs."

Attaching Starters

Fixing starters in "cogs" should be done carefully. The "ladder" illustrated is a device that greatly assists in the correct spacing and attaching of the foundation wax strips. Melted wax from a bent-up dessert spoon is run into position. The wide gap in the ladder takes two starters opposite one another, and the procedure is to wax in two strips, then completely reverse the "cog" and wax in the other three, making five starters altogether. This explains the wider centre gap in the "ladder." After the "ladder" has been carefully lifted out the unwaxed sides of the starters must be run with melted wax to strengthen their hold on the "cog." The wax should flow freely, but must not be too hot. Mr. W. Marsden, another "cog" honey producer, has five grooves made in his "cogs," similar to the cut in a single-groove frame. He waxes the foundation into the grooves by the use of a specially-shaped spoon made of aluminium, under which he holds an electric soldering iron, to heat the spoon, which in turn melts a stick of wax pressed on to its hot surface. The shape of the spoon guides the wax into the grooves.



Empty cog and cog with starters waxed in; ladder, spoon and wax strips.

Cog on left shows why cogs must be turned around to get them completed.

Removing the Crop

As previously described, comb attachments, if any, are broken by drawing a wire across below the set of boxes to be removed. "Cogs" are, of course, full of bees when taken off and it is impossible to get every bee out at short notice. During the honey flow completed "cogs," after a preliminary light shake, may be set close to the hive entrance with the comb exposed upwards. A little smoking usually starts the bees moving from the "cogs" towards the hive entrance. Most of the remaining bees can be shaken out, but care must be exercised lest the combs are shaken loose. Practice is the only teacher in this matter. When the flow is about over and there is danger of bees robbing "cogs" must be shaken quickly and covered, even if many bees have to be taken into the honey house; these can be ejected from windows afterwards.

—R. S. WALSH, Apiary Instructor, Auckland.

The Gardener's Faith

THE true gardener is never overmuch disquieted by bad seasons, whether they are seasons of drought or of frost. The half-hearted gardener thinks that all is lost when he has lost one season; but the wise man's caution has a very wide meaning: "He that observeth the wind shall not sow, and he that regardeth the clouds shall not reap." The fair-weather gardener, who will do nothing except when wind and weather and everything else are favourable, is never a master of his craft. Gardening, above all crafts, is a matter of faith, grounded, however (if on nothing better), on his experience, that somehow or other seasons go on in their right course, and bring their right results.—*Canon Ellacombe.*

Notes for the Poultry Farmer

Importance of Good Housing

(Continued.)

— By —
F. C. BOBBY,
Superintendent of Poultry Husbandry, Wellington.

WITH the laying house completed consideration must now be given to the interior fittings. These will vary considerably according to individual ideas, but should aim at effecting sanitary conditions and where possible a saving in labour. Furthermore, interior fittings should take up as little floor space as possible. While no attempt can be made to describe all the many different types of fittings which are to be seen on farms, a few examples will be described and illustrated.

Perches

In the first place 8in. of perch space should be allowed for each light-breed bird and 9in. for each heavy-breed bird. The distance between perches is shown as 18in. in the plan of a laying-house (Fig. 2 in May article). This is the maximum distance necessary and a useful distance in the warmer climate of the North Island. This can be reduced to 14in. in cooler climates without any detriment to the birds.

The perches themselves should be of dressed 3in. x 2in. scantlings, with the 2in. side upwards and the corners rounded off. In order to check red mites, which collect during the day between the underside of the perches and any wooden bearers used to carry the perches, it is a common practice to use iron uprights (gas piping) instead of wooden bearers. Fig. 10 shows a small perch fitted in this way. Even where iron is used in this way it is sound practice to fill the socket in the wood into which the iron upright fits with old car oil. The perches should be dressed annually with a mixture of two-thirds creosote and one-third kerosene as a protection against red mites.

Another method of fixing perches is to use angle iron cross supports which are hinged to the back wall of the house and when in position for roosting are supported in the front with wooden legs. Figs. 11 and 12 illustrate this type of perching. For those who wish to give the birds full

Fig. 10.—Perch fixed on gas pipes.

Fig. 11.—Perch in position for roosting.

POULTRY FARMERS

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Fig. 12.—The perch folded up against the back wall.

use of the floor space and do not mind the birds ranging over the droppings which accumulate at night this is an interesting method of perching birds. It leaves the entire floor clear, stops birds perching during the day, and is most convenient when catching birds in the house for culling and selection.

A further suggestion is offered to those who wish to have some protection against internal parasites such as worms and coccidia. A light wire-netting frame attached to the front supports and 3in. or 2in. netting fixed under the perches will prevent the birds scratching among the nightly collection of droppings. Since the perches are hinged at the back the whole perching equipment may be lifted up and held against the wall when cleaning out under the perches. It must be admitted that the floor space under the perches is lost to the birds, but where internal parasites are troublesome this is a method of reducing the chances of heavy infestation among the birds.

Perches should not be set higher than 2ft. 6in. (top of perch) from floor level.

Nest Boxes

Here again many types of nest boxes may be seen on different farms. These will vary from kerosene tins with one side removed to most elaborate ranges of nest boxes where the only access is by a darkened passage at the back of the nests. Whatever type is favoured certain main essentials should be kept in mind. Nest boxes should be so constructed that it is an easy matter to keep them **in a sanitary condition at all times.** They must be kept free of all vermin and be easily cleaned out wherever the litter becomes fouled with droppings or a broken egg. Clean conditions help materially in obtaining clean eggs, and it should be the object of every poultry farmer to obtain clean eggs rather than cleaned eggs for marketing purposes.

Where divisions are used in nest boxes allow one nest to every four or five birds in an ordinary commercial laying-house. Each nest should be not less than 12in. x 12in., with a height of approximately 12in. to 13in. For ease of cleaning and to avoid vermin the floor of the nests may be made of tightly stretched ½in. mesh netting, upon which is placed the straw. While the front of the nest is open there should be a 4in. board at the bottom in front to prevent the nest litter from being scratched out too freely.

Trouble is met from vent pecking when birds are actually egg laying, and for this reason some poultry-keepers prefer the nests to be darkened. This darkening of nest boxes also tends to prevent egg eating. Both vent pecking and egg eating are vices which may make their appearance among a flock of birds during any laying season. Figs. 13 and 14 illustrate nest boxes which are constructed with a view to placing the openings to nests towards a wall and thereby darkening each nest box. Note the running board along which the birds must pass to enter the nests. These boards come between the nests and the back wall of the house; the back of the nest is hinged and thus opens to allow eggs to be collected.

Figs. 15 and 16 illustrate the ordinary type of nesting accommodation with the front of the nest open directly to the pen. It will be observed that in the nests illustrated no back has been fastened to the line of nests. The complete set of boxes hooks straight on to the wall of the house and the weight is carried on a bearer nailed to the wall at the bottom and back of the nests. This allows the whole equipment to be let down for cleaning purposes, when the boxes are cleaned out from the back—an easier matter than cleaning out from the front where the 4in. litter board is encountered. A small compartment is

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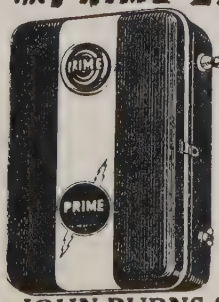

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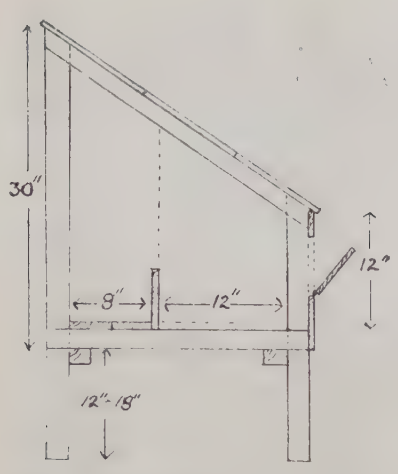


Fig. 14.—Materials: 2in. x 2in. or 1in. dressed. Solid or wire netting floors. Sloping top, wood or sheet metal. Partitions every 12in. Nest openings face on to wall of house.

built into the top of the row of nests for storing eggs temporarily during the day. It should also be noted that the landing perch in the front is hinged. At night this landing perch is hooked into a vertical position when it will cover the centre of the openings to the nest boxes and so prevent birds roosting in the boxes at night.

Lastly Fig. 17 illustrates a type of nest box that is built into the front of the house. Here again the landing board is hinged for closing the nests at night. The floors of these nests should be solid, as they are protruding outside the house and it is not desirable to have litter falling through on to the ground outside. It may be added that flat asbestos sheeting makes an excellent material for covering the wooden framework of the nests illustrated in Figs. 13—16. This material is easy to clean and reduces the chances of vermin to a minimum. As a covering for the sloping top of the nests it is easy to keep clean and offers a particularly difficult surface should birds attempt to perch on it.

Trap-nests

Where the poultry farmer wishes to trap-nest his birds some type of simple trap-nest front to the nest boxes is required. There are a number of types of trap-nest fronts, but the one illustrated in Fig. 18 is both simple and inexpensive, while still effective. Where trap-nesting is undertaken one nest box to every three birds should be allowed. Apart from the special front designed to shut the bird in after she has entered the nest box the remainder of the construction is similar to the nest boxes described above.

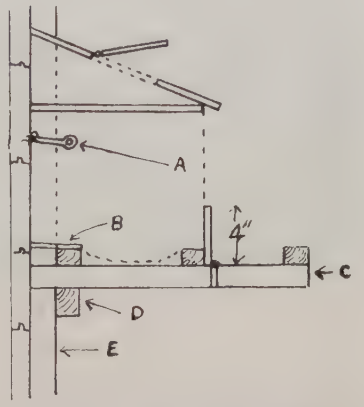


Fig. 16. — Approximate dimensions, 12in. x 12in. x 12in. Partitions, roof, top of nests, front board, ½in. dressed. Bottom, stout ½in. wire netting. Bearer, framing, hinged perch, 2in. x 2in. Wall of house acts as back of nest. A. Hook and eye for fastening to wall. B. Block between studs. C. Alighting perch swings up to shut nest. D. Bearer along front of studs. E. Wall stud.

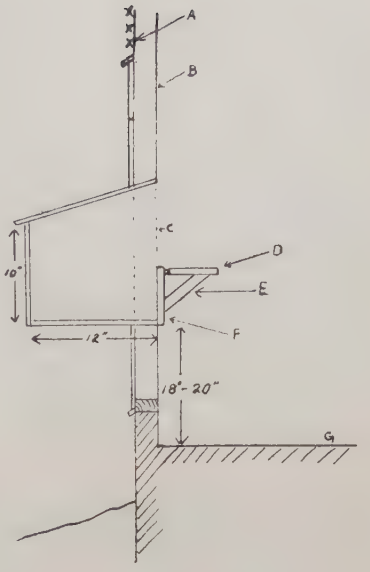


Fig. 17.—External type nest box. Use 1in. timber. Sloping top may have malthoid on outside if desired. Hinged alighting board to swing up and close nests at night. Single row along front wall of house. Partitions at each stud or every 20in. A. Wire netting on open front. B. Front stud. C. 8in.-10in. opening. D. 6in. x 1in. hinged alighting board. E. Bracket. F. 4in. x 1in. G. Concrete floor.

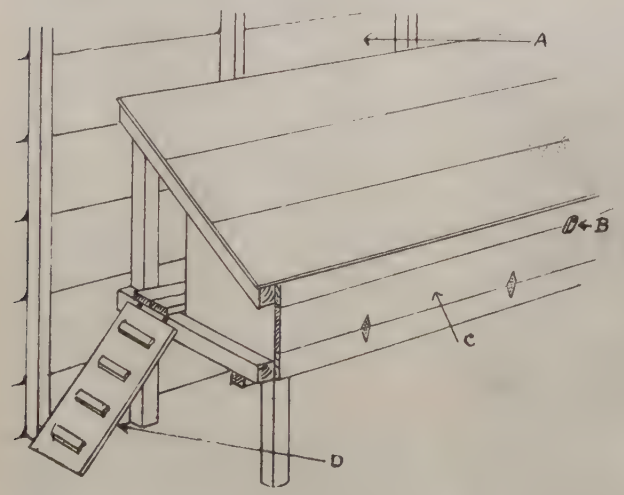


Fig. 13.—A. Wall of house. B. Turn button. C. Hinged flap for egg collection. D. Hinged board closes passage to nests at night.

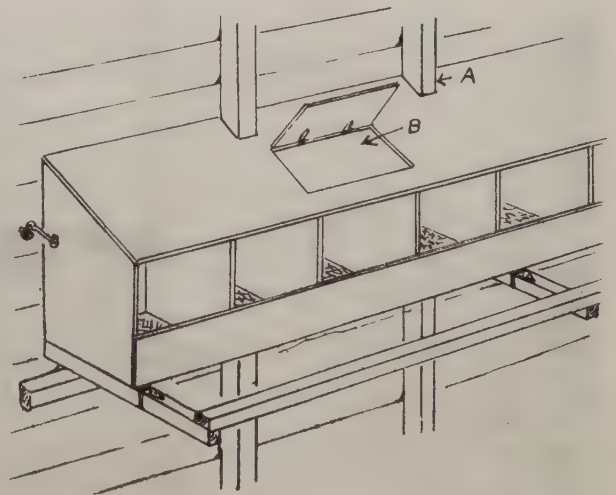


Fig. 15.—Wall type nest box. One nest for every three hens. A. Recess in nests for studs. B. Egg storage compartment.

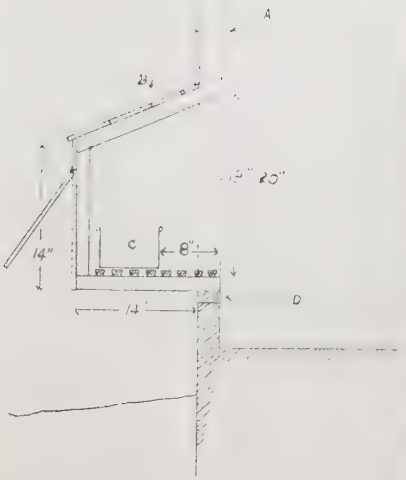


Fig. 18.—Use 2in. x 2in. or 1in. dressed timber. Approximate dimensions shown. Length of drinker 3ft. for 100 birds. A. Front wall stud. B. Alternative position for hinged flap. C. Drinker stands on bevel-edged slats. D. Bottom plate.

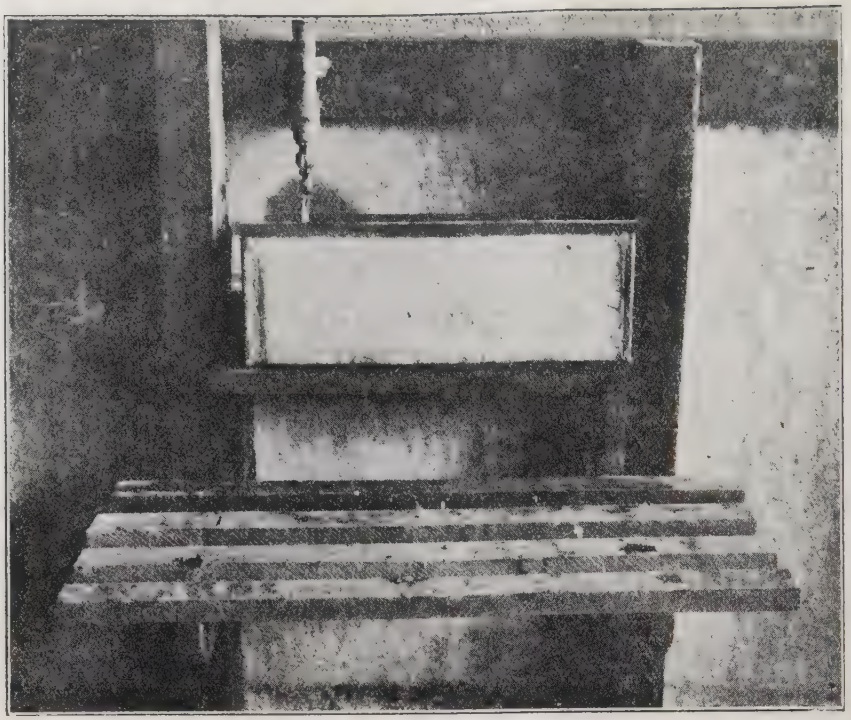


Fig. 19.—A drinking tank, showing drip method.

Watering Birds

The two main features of any system for watering birds are: (a) that the system shall prevent as far as possible any water being scattered on to the litter of the house; (b) that the system shall be simple and, most important of all, easy of cleaning. There are a number of ways in which this can be effected. A simple narrow trough running through a wall of the house (front or side wall) with a landing perch on the inside of the house where the birds drink and a tap feeding into the portion projecting outside the house is both simple and effective. The whole is placed about 2ft. above floor level and the trough may be pulled out from outside the house for emptying and cleaning.

Another method is to place a metal trough in a projection similar in construction to the outside nest boxes shown in Fig. 17. This is placed 6in. to 8in. above floor level. The floor, instead of being made solid as in the nest box, is made of 1in. slats placed $\frac{3}{4}$in. to 1in. apart. These slats allow any spilt water to run through on to the ground outside the house and thus prevent wet litter in the house.

In a level house comprised of a number of pens these water boxes may have their troughs connected up and linked to a master cistern with a ball-cock control at the end of the house, which will automatically fill each trough to any desired level by gravity feed. This has the advantages of saving labour and ensuring that there is always water in front of the birds. Against this, however, are the disadvantages that the troughs are fixed and thus more difficult to clean, while should colds or disease break out there is a risk of spreading trouble from one pen to the next through the water supply.

Figs. 19 and 20 illustrate a drinking tank fixed in a dividing wall between two pens and serving the birds in each pen with water. In this case each tank is fed with water from a gas tap fitted to a $\frac{1}{2}$in. water pipe. The tap is allowed to drip, and in consequence it is necessary to fit an overflow pipe to the tank, which overflow carries surplus water to the outside of the house. Fig. 21 shows how this overflow is fixed. A plug in the bottom of the tank will also be seen. This is used for emptying the tank when the latter is cleaned. The perching platform is placed 2 ft. from floor level.

To summarise, any water equipment used should supply ample water at all times, be so constructed that drips

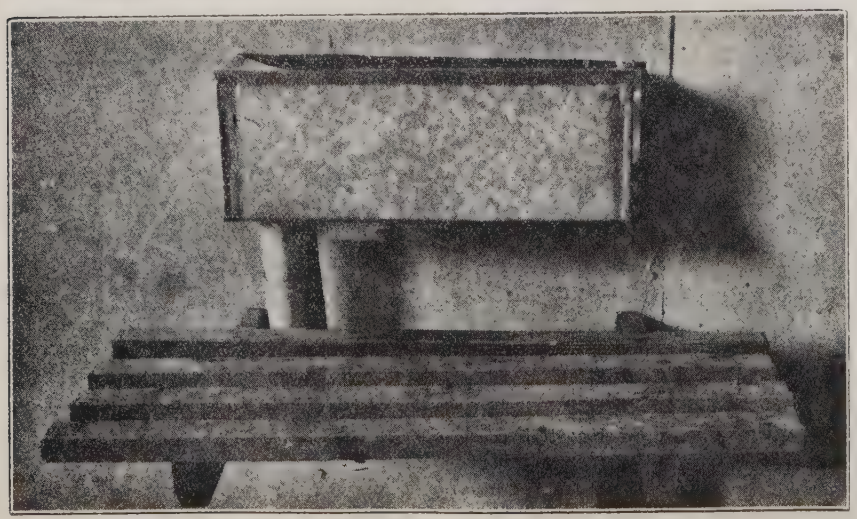


Fig. 20.—The same tank as shown in *Fig. 19* seen from the other side of the partition. The waste pipe is seen below the tank.

from birds' wattles, etc., will not fall on to the floor litter, be easily cleaned, and finally be so placed that the water will not be fouled by droppings or birds' feet.

Grit and Shell Boxes

The last of the interior fittings for a laying-house is a simple two-compartment open box hung on the wall

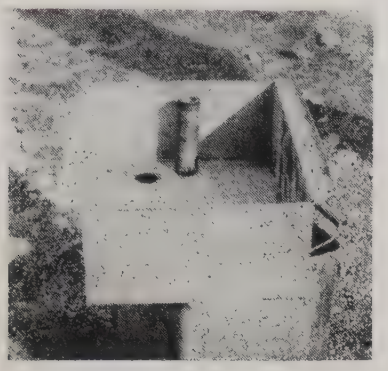
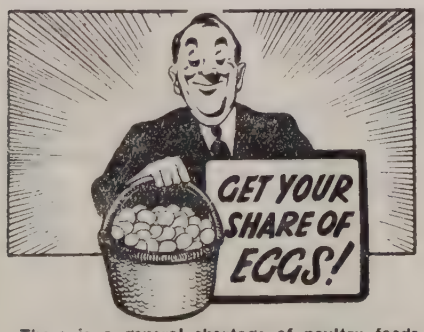


Fig. 21.—Single tank showing waste outlet and plug.

of the house at a convenient level for birds to feed. This open box or trough should contain hard metal grit in one compartment and oyster shell in the other. Obviously the size of this box will depend upon the size of the flock of birds to be supplied with these two types of grit. Both are necessary to the birds and an adequate supply should be in front of laying birds at all times.

(To be continued.)



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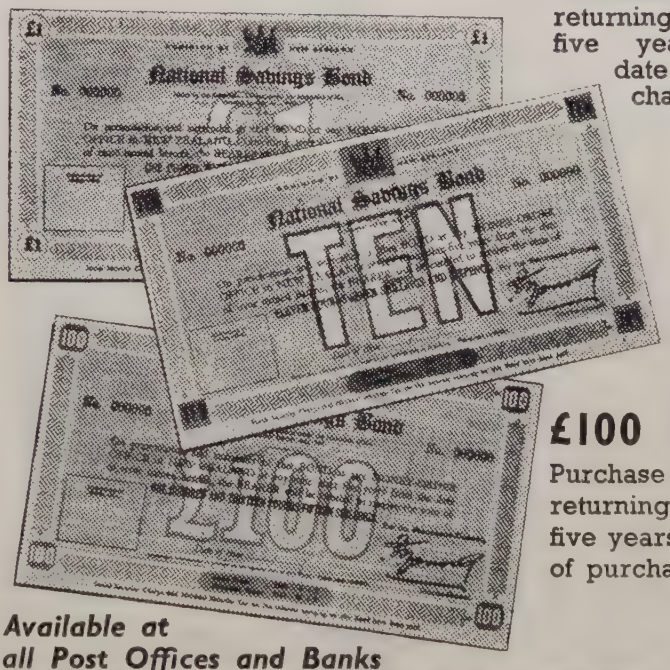

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Federation of Young Farmers' Clubs

Young Farmers' Responsibility in Production Drive

(By Mr. D. S. Ross, Te Puke, Immediate Past President N.Z. Federation of Young Farmers' Clubs.)

I AM making this special appeal to all members of the New Zealand Federation of Young Farmers' Clubs to accept a very deep responsibility for increasing primary production in every direction this coming season. So much has been said recently about the food position in Great Britain that all our members must be conscious of the necessity and urgency for making available additional foodstuffs for the people of the United Kingdom. A cry goes out today from the British Isles for more food, and still more food; and now that the invasion of Europe has commenced ever-increasing demands will be made upon the food resources of Britain. This must surely spur us on to further effort, and the time has come when our Young Farmers' Clubs Federation must accept this challenge and through its councils and its clubs must see that nothing shall stand between its members and maximum production.

I am deeply conscious of the many domestic problems that may distract and discourage you in your efforts, but the majority of these pale into insignificance compared with the great issue before us today. Let us rise above them all and disregard them until the war is won.

It is most difficult for us who are so far removed from the actual scene of war—so far removed from the British Isles—to see conditions there in their true perspective. Letters from our members overseas convey so much; contacts with people we meet, and who really know the position, make impressions of a kind; but until the bitter realities of warfare have actually been experienced most of us will frankly admit that we cannot understand. In this country where no bombs have fallen and where no buildings have been razed as a result of enemy action, where we have not even been within earshot of enemy guns and where our tables and our larders are still provided with enough and to spare, is there any wonder that complacency and apathy dwell among us? We are inclined to think that everything is running along so smoothly, and that in the end all will be well. But wars are not won by hopes and confidences in the future, but by preparedness to the limit of our resources, and that must be our goal. High authorities tell us today that the greatest munition of war this country can produce is food, and in a country such as this, with all the advantages we possess for producing foodstuffs, it is surely the patriotic duty of every tiller of the soil to let everything that might directly or indirectly retard production of food be forgotten in the meantime. I suggest that every member of the Young Farmers' Clubs organisation in this country weigh this question, and try to visualise the effect this will have on what we trust are the closing chapters of this tragic war. A maximum war effort must surely bring hostilities to a close much sooner than would otherwise be the case, and in a war such as this every week brings forth additional horrors and destruction of almost unbelievable magnitude. Everything that might retard the production of foodstuffs must go by the board, and in the meantime let "maximum production" be our watchword. To demonstrate this in the affirmative brings nearer the end of war; to demonstrate it in the negative is prolonging hostilities and playing into the hands of the enemy.

Food Supply Conference

You will all recall how about three months ago members of the National Council of Primary Production and representatives of the dairy industry were called together in Wellington to discuss the vital necessity of increasing supplies of foodstuffs to the people of the United Kingdom. Your own Federation of Young Farmers' Clubs was represented. Cablegrams from Great Britain set out the position clearly, and Mr. Bankes Amery, leader of the United Kingdom Food Mission, who was, until recently, in New Zealand representing the Food Ministry at Home, addressed the conference. So serious was the position that the members of the conference, all of them responsible leaders of the various sections of our farming interests, carried this resolution:—"Having heard from the Prime Minister the exchange of cablegrams regarding food supplies, and having heard Mr. Bankes Amery, the representative of the United Kingdom, this gathering of representatives of the primary producers highly resolves to do its utmost to prevent a further reduction in the rationing of food commodities to the people of Great Britain, who have saved us and saved the world." That resolution was not framed lightly, and, as your representative at that conference, I now ask **you**, as individual members of your Federation of Young Farmers' Clubs, to highly resolve to do **your**

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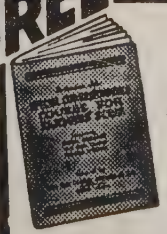

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Income and Expenditure Account, 1943-44.

	£ s. d.	£ s. d.
TO *Fees Payable for Year 1943/44.*		
No. 1 district	16 16 0	
No. 2 „	22 1 0	
No. 3 „	19 19 0	
No. 4 „	15 15 0	
		74 11 0
„ Sundry payments (Y.F.C. Folders, etc.)		78 16 8
„ Bank Charges		0 10 0
„ Refund Travelling Expenses		10 10 0
„ Sundry Petty Cash Payments		1 11 0
„ Grants to Councils		400 0 0
„ Depreciation on Projector		11 18 5
„ Excess Income over Expenditure ..		0 18 6
		£578 15 7
BY *Fees Payable for Year 1943/44.*		
No. 1 district	16 16 0	
No. 2 „	22 1 0	
No. 3 „	19 19 0	
No. 4 „	15 15 0	
		74 11 0
„ Money forwarded by Ngatimoti Club to be held in Trust		0 16 0
„ Profit from Trading Account		2 17 6
„ Government Grant	500 0 0	
Less Deductions	0 8 11	
		499 11 1
„ Reimbursement Journal Subs.		
1941/42	0 18 0	
1942/43	0 2 0	
		1 0 0
		£578 15 7

Balance Sheet, 1943-44.

LIABILITIES.	£ s. d.	£ s. d.
TO *Sundry Creditors.*		
Affiliation Fees received but not yet disbursed—1943/44	19 1 6	
1944/45	2 2 0	
		21 3 6
Affiliation Fees payable to Councils but not yet received		6 6 0
„ *Accumulated Funds Account.*		
Balance as at 1/5/42 ..	808 4 1	
Plus excess Income over expenditure	0 18 6	
		809 2 7
		£836 12 1

ASSETS.	£ s. d.	£ s. d.
BY Cash at Bank		713 4 11
„ *Sundry Debtors—*		
Affiliation Fees Outstanding		6 6 0
Credit Sales		0 8 0
Free Issues of Constitution to Organising Secretary		0 5 0
Stock as at 30/4/44		23 7 1
Projector	£79 9 6	
Less Depreciation ..	11 18 5	
		67 11 1
Cups and Trophies ..		25 10 0
		£836 12 1

utmost to prevent a further reduction in the rationing of food commodities to the people of Great Britain, who have saved **you** and saved the world. The only way to honour this is to produce the maximum you are capable of producing—nothing less; and in the meantime, without complaint, and with characteristic fortitude, the people of Britain carry on!

When one refers today to the people of the United Kingdom it is difficult to visualise what staggering figures may be involved. Supplying food to 47,000,000 people, plus the soldiers—and their number must be legion—is no easy task. And when one realises how completely many supplies have been cut off from pre-war sources the necessity for a greater effort in this country becomes more and more evident. Many of our members have listened to the broadcasts of Mr. Bankes Amery, or have seen his statements. Many have even had the opportunity to listen to his addresses, and in all cases no doubts have been left as to the necessity and urgency for a maximum production effort. He has indeed fired our imagination and touched the hearts of us all. If there had been any doubts previously, these have been dispelled by now.

Clear-cut Programme

Many people in this country, and no doubt many Young Farmers' Clubs members, have been waiting for a clear-cut production programme. They have it today. The Minister of Agriculture has announced objectives which it is desired this country should attain. These objectives are clearly set out in your May issue of the N.Z. Journal of Agriculture. The targets set are quite within New Zealand's capacity. Our duty is now doubly clear.

Planning and organising in your own particular line, to the best of your ability, with the will to carry the programme through, will attain our goal. We must assist one another, and I believe it will be most helpful if you will discuss this production programme at your club meetings. Deal with it in a fair and straightforward way. Discuss methods of farming with one another. Secure the attendance of practical farmers at your club meetings to give lectures, and take full advantage of every opportunity to acquire knowledge to fit you for your high calling. The Journal of Agriculture with all its informative articles can be studied at home and at your club meetings. Listen in to the many farming talks that "come over the air" from the various stations, and persuade others to do the same. All these talks are supported by practical experience, and the knowledge gained and applied to your everyday work will not only help you, but will assist in maintaining the present meagre ration of food for the people of Britain, which is all important.

Foster Club Activities

Your clubs can be a tower of strength to your members in these critical days. I see no reason why any

of your activities should be curtailed in any way. Encourage members to attend meetings regularly, and give particularly to the younger members a real live interest in the club affairs. Be loyal to the officers of the many clubs and councils. Clubs should endeavour to play their full part in the struggle for peace. Competitions and field days should still go on. Enrol new members, and through this movement, which encourages an agricultural bias and fosters an agricultural education, develop in them a deep sense of responsibility, and thus fit them to be the leaders of our great primary industries, leaders in the oldest and most honourable calling in the world. We need then have no fear whenever a cry goes forth for more food for the people of the United Kingdom. If we all work with the will to win, we can achieve what we must now set out to do.

Already the movement is proud of the war record of all its members on the battlefields and on the farms. Over 3500 of its members are in the forces. We would not let them down, nor must we let the people of Britain down. We can never repay them in full for the hardships they have endured and the sacrifices they have made, and we shall never forget that there are, in the British Isles, Young Farmers' Clubs whose members are taking their full share in a stupendous war effort. In this country every member of our organisation, from the youngest to the eldest, has a vital job to do.

I am quite certain that, with the combined efforts of all our members, we can not only attain the production goal that is set, but we can exceed it; and I have every confidence that all our members will play their part, individually and collectively, inside the movement and outside of it, to achieve the objective set for this coming season. A grave responsibility now rests upon the shoulders of us all.

Y.F.C. in Forward Areas of Pacific

By 602235 L/Cpl. Harris, L.N.E., of A.E.W.S 8 Bde. H.Q., on behalf of the secretary, 8 Bde. Y.F.C.'s Brigade Committee.

ON December 23, 1943, delegates from the various units which make up the 8 Bde. of the 3 Div. gathered together at Headquarters to discuss the formation of Young Farmers' Clubs and the creation of a central controlling group at H.Q. to guide and help the clubs of each individual unit.

From the very start the idea took a strong hold on those of the troops interested in the land as a source from which to win a living, and in January of the New Year club meetings started in nearly all the major units.

Membership of the clubs has altered very little indeed since their first inception, and as no fees are charged the estimates are framed on average attendance at meetings. Obviously such figures are bound to be lower rather than higher than the actual number of men interested, as all would not be able to attend every lecture.

At any rate, the figures are startling. The average attendance throughout the Brigade is 650, a figure in the region of 20 per cent. of all personnel. Moreover, there has been a slight but steady increase from the commencement, and this factor alone indicates that interest has been fully maintained in the clubs' activities despite the many drawbacks, such as bad weather, ill health, counter-attractions, and service duties, all of which must constitute a continuous drain upon the adherents' attendances.

Method of Operation.

In general, each unit tries to produce lecturers from its own members, amongst whom experts on some particular type of farm production are always available, and to supplement the lectures by discussions afterwards. Recently debates have also been most successfully introduced on such subjects as "Tractors or Horses on the Farm."

This scheme has had excellent results, not the least of them being that many a man who has never before faced an audience has discovered that, on his own ground, he can talk effectively and with interest to those who are willing to listen.

Another exceedingly important factor is brought in by the wide cross-section of life covered by any Army unit. Thus a dairy farmer of North Auckland may hear personally, and for perhaps the first time, of the difficulties that confront the wheat growers of the South Island, or Canterbury shepherds get a better idea of stock farming in such remote areas as the King Country. Methods and ways for overcoming obstacles obtain a free circulation and many a useful hint from Westland, say, may be found valuable, after the return of the men in Hawke's Bay. Even the lordly Waikato might glean a scrap or two of useful knowledge from Taranaki!

But apart from these "personal" lecturers, the Brigade A.E.W.S. officer organised a central panel of lecturers who were available, upon request, to any unit that had a gap in its programme. These lecturers are all fully experienced men, able to speak with authority and to answer the questions which inevitably follow their talks.

To enable an appreciation of the wide scope covered, a list of the lecturers and their subjects is given below:—

Captain Iversen, 36 Bn.: 1. Genetics and Animal Breeding; 2. Soils and Manures.

Lieutenant Dick, Malaria Control Unit: 1. Buying a Farm; 2. Grassland Farming; 3. Insect Pests in Relation to Farming; 4. Light Land Farming in Canterbury.

Lieutenant Hewland, A.E.W.S., 8 Bde., H.Q.: Soil Erosion.

Pte. Heenan, 7 Fld. Amb.: Fruit Farming.

Pte. Pole, 8 Bde., H.Q.: Banking as Concerns Farming.

Sgt. Balthrop, 34 Bn.: Rehabilitation Act.

Pte. Anderson, 34 Bn.: Farm Accountancy and Taxation.

Pte. Penny, 8 Bde., H.Q.: Aims and Objects of the Y.F.C. Movement (followed by a lecture on Pig Production).

L/Bdr. Ryan, 208 L.A.A. Bty.: Veterinary Surgery.

Gnr. Cowin, 208 L.A.A. Bty.: Tobacco Growing.

Sglmn. Childs, 8 Bde., H.Q.: Header Harvesting.

The size of the audience might vary from a battalion gathering of 180 men to a small group at an outlying battery mustering no more than perhaps 15 adherents, but all units have an equal claim upon the panel and receive full service. The most popular lectures have proved to be:—1. Genetics and Animal Breeding; 2. Rehabilitation Act; 3. Grassland Farming; 4. Soil Erosion; 5. Pig Production; 6. Veterinary Surgery; 7. Farm Accountancy and Taxation; 8. Banking as Concerns Farming.

H.Q. Committee.

It has been the custom of the unit delegates to meet once a month to render a report of their individual clubs and discuss plans for the future. One of the best features of this monthly meeting has been the exchange of opinions regarding the lectures and the pooling of new ideas. Each delegate brings a written report of his club's activities during the past month and is at liberty to put forward remits for the central organisation in New Zealand. The following is an illuminating report taken from the last delegates' meeting, and is shown here in full and without any alteration at all.

7 FLD. AMB. Y.F.C. REPORT.

Since last meeting of delegates on March 17 we have had three meetings.

March 20: Attendance 21. Subjects:—"Calf Raising," dealt with by Pte. Symons of No. 1 Recovery Sec.; and "Handling the Wool Clip," by Sgt. Mowat, of 23 Fld. Coy.

Pte. Symons gave a concise talk on calf rearing, covering all points very well. No argument was raised in the discussion and only a few extra suggestions were put forward from the floor.

Sgt. Mowat's talk was based on his experience as a wool-classer in many sheds and was most interesting and instructive to all present. Many questions were asked afterwards.

March 27: Attendance 32. Subject:—"The Land Sales Act," by Sgt. Balthrop, 34 Bn.

The speaker outlined the purposes of the Act and how it would probably affect us. He then explained the machinery for carrying out the provisions of the Act and finally covered the much-discussed "basic valuation." Many questions were asked and a few opinions expressed. Members seemed to appreciate the spirit behind the Act, but were not satisfied as to its full success as yet.

April 3: Attendance 17. Subjects:—1. "Aims and Objects of Young Farmers' Clubs"; 2. "Pig Production." Speaker: Pte. Penny, 8 Bde. H.Q.

Pte. Penny showed us that he knew practically everything about the Y.F.C. movement in New Zealand. To sum it up, the Y.F. Clubs exist to promote farming and rural life and have done a lot towards those ends. The talk on "Pig Production," which was based on the A.E.W.S. animal production course, dealt with pig types for pork and bacon and scientific feeding and housing. For those interested it was most instructive.

Summary: We had good lectures and a fair attendance, the No. 1 Recovery and 23 Fld. Coy. being still represented. Interest has deepened, there being new applications for A.E.W.S. courses.

Most members were keen enough to stay on at the meeting after an opportunity was given them to leave for the pictures at 7 p.m. The executive resigned their offices to give newer members a chance to take office. Elections not yet held.

Legislative Suggestions.

The above report, by L/Cpl. Odlin, gives a very fair idea of the activities of the clubs and the concluding paragraphs are significant also. One point, however, is not brought out by this particular document and that concerns the interest taken by the members in the political side of farming. Recent delegates' meetings at H.Q. have been productive of definite suggestions for future legislation in regard to returning farmers and would-be farmers, and in view of the strength of the movement in the Brigade it is felt that any Government wishing to study the desires and interests of homecoming men from overseas would be well advised to take note of them.

Two remits, to be forwarded to the New Zealand Federation of Young Farmers' Clubs, are of greatest interest in that they request, in the first case, "a purchasing clause shall be included in every case where a man is settled on the land," and, secondly, "that local special committees empowered to recommend men for land settlement or training shall have a predominance of practical young farmers who have had modern experience, and shall **not** be run by retired business men or old-fashioned and impracticable farmers of a type now obsolete."

For maintaining the satisfactory running of the clubs' affairs credit is due to the president, Sgt. Myers, and secretary, Pte. Penny, both of whom have worked hard to help promote interest and efficiency. The 10 members of the committee have also pulled their weight with a will and the list below shows their names, units, and the average attendance of their clubs:—

Sgt. Myers, 34 Bn., 180; Sgt. D. McL. Smith, 36 Bn., 120; Pte. J. C. Robinson, 29 Bn., 80; Gnr. Kennedy, 50 Bty., 40; Bdr. Wright, 54 A/Tk. Troop, 40; Bdr. Denton, 49 Bty., 30; L/Cpl. Odlin, 7 Fld. Amb., Pte. D. Marshall, No. 1 Rec. Section, and Sgt. A. C. Mowat, 23 Fld. Coy., 25; L/Bdr. Plummer, R.H.Q., 38 Fld. Rgt., 25; Dvr. Morton, 4 M.T., 25; Pte. Fraser, M.M.G., 25; Pte. C. J. Penny, 8 Bde. H.Q., 17; Gnr. Burton, 50 Bty., 15.

Reports on Club Activities

WESTERN SOUTHLAND.

Dipton.—General discussion. Decided to exchange letters with J. Crawford, a former club member now attending Lincoln Agricultural College. Members of the club accepted an invitation from the Farmers' Union to listen to an address by Mr. McIntyre. Seven members present out of 16.

Southland Technical College Y.F.C.—New club recently formed, with 74 members. Officers elected at initial meeting:—Advisory presidents, Messrs. C. A. Stewart (principal), and K. McKinnon (agricultural master); chairman, E. Sutton; vice-chairmen, A. Lloyd and McNulty; secretary, R. Vial; treasurer, V. Vial.

Woodlands.—Annual meeting. Officers elected: Advisory president, Mr. G. Stevenson; chairman, K. Maxwell; vice-chairman, W. Barron; secretary and treasurer, K. Timpany; associate advisory members, Messrs. G. Middlemiss, Denniston, Gibson Smith, and Whitting. An address on "Farm Economics" was given by Mr. Whitting. Nine members present out of 12.

Wyndham.—Annual meeting. Officers elected: Advisory president, Mr. F. J. Dunbar; chairman, I. McDonald; secretary and treasurer, T. B. Hunter. Thirteen members present.

SOUTH OTAGO.

Warepa.—Decided to ask the secretary of the Miners' Union, Kaitangata, to speak at the next meeting. A "working bee" at the cemetery arranged. Interesting talk on "Draining" by Mr. Miller; the speaker dealt particularly with tile draining. Sixteen members present out of 23.

DUNEDIN.

West Taieri.—Letter of congratulation to be sent to A. R. Rankin, on his winning a scholarship for entry into Lincoln College. Report on last dance: profit, 30s. Total profit from club dances run during summer months, £15 15s, which amount will be handed to the Patriotic Committee. Talk by Mr. W. Crawford on "The Value of Trees to the Farmer." There was an attendance of 10 members out of 20.

NORTH OTAGO.

Enfield.—Decided to collect photographs of members overseas for the club Roll of Honour. Field day to be held at Mr. D. Kennedy's at a date to be decided upon. Letter of condolence to be written to J. Turnbull, who is in hospital. Eleven members present out of 13.

SOUTH CANTERBURY.

Geraldine.—Remit to be forwarded to district committee in connection with the notification to clubs as to when affiliation fees are due. A welcome was given to Cliff Burrows, a member returned from overseas. Gunner Cliff Burrows gave an interesting talk on "Fiji, Noumea, and New Caledonia." Twenty members present out of 26. At a previously unreported meeting the Stock-judging Cup was presented to I. J. Sheed, and talks were given as follows: "Terms Used in Purchasing a Farm" (Mr. Cook) and "Pigs" (Mr. McIntosh). Officers elected at the annual meeting: Advisory presidents, Messrs. Crotty and Little; chairman, P. Temple; vice-chairman, E. Worner and O. Neutze; secretary, I. J. Sheed; treasurer, F. Greenall. Twenty-two members present at the annual meeting.

MID-CANTERBURY.

Hinds.—Two new members enrolled. The impromptu speech contest for the Simmons Cup was held, Mr. D. M. Bruce acting as judge. The results were:—J. R. Cocks, 1; W. S. Taylor 2; I. Donaldson, 3. These three members were selected to represent the club at the forthcoming inter-club debate. There was an attendance of 15 out of a total membership of 22. At the previous meeting a lecture was given by Mr. J. H. Grigg on "The Corriedale Sheep and the History of the Breed," accompanied by a demonstration on five sheep. Final arrangements were made for the club's annual ball. Eighteen members present at the meeting.

Methven.—Two new members enrolled. The chairman gave a report on the annual meeting of the Mid-Canterbury District Committee, and also on the club's annual stock-judging day. W. Hart gave a report on the last meeting of the A. and P. Association. Final arrangements for the club's second annual ball. Members to give five-minute speeches at the next meeting for Mr. Dunkley's Cup. Lecture by Mr. G. K. McPherson, Department of Agriculture, on "The Certification of Farm Seeds," after which he answered a number of questions. The presidents of the Methven A. and P. Association and the Farmers' Union, together with five other farmers, attended the meeting. Twenty-five club members were present out of a total of 64.

CHRISTCHURCH.

Ellesmere.—Three new members enrolled. Letter received from the Ellesmere Technical Association asking for the club's support. A lecture was given by Mr. J. W. McLean, of Lincoln College, on the subject of "Reproduction and its Abnormalities." There was an attendance of 27 out of a total membership of 50.

MARLBOROUGH.

Flaxbourne.—Annual meeting. Officers elected: Advisory president, Mr. W. S. Morris; chairman, James Forsyth; vice-president, John Forsyth; secretary, D. Johnstone. Two new members were enrolled; 12 members present at the meeting.

Seddon.—Annual meeting. Officers elected: Advisory president, Mr. W. J. Kennington; chairman, N. Gee; vice-chairman, M. McKee; secretary and treasurer, J. Hammond; hon. auditor, Mr. Lockhart. There were nine members present; six more new members were elected.

NELSON.

Dovedale.—Annual meeting. Officers elected: Advisory presidents, Messrs. F. M. Burnett and P. A. Jordan; chairman, W. Smith; secretary and treasurer, C. Burnett.

R.N.Z.A.F., Nelson.—This club was formed on March 1 last, and has been holding regular weekly meetings since; a number of field days have also been successfully undertaken. These latter included field demonstrations on the farms of Mr. R. C. T. Raine, Oaklands, Stoke, and Mr. Rodgers, Richmond, and at the orchard of Mrs. Robinson, Stoke (demonstration conducted by Mr. Richardson, Department of Agriculture); and a tour of the Cawthron Institute, conducted by Sir Theodore Rigg. Weekly meetings have taken the form of discussions and short talks on such subjects as "Sheep Breeding," "Rehabilitation and Soil Fertility"; a debate, the subject of which was "That the Organic Manures are of More Value to the N.Z. Farmer than Inorganic Manures." Lectures have been given as follows: a short film on "Truck Farming"; "Insects and Insect Pests in Relation to Agriculture" (Mr. Gouley, Cawthron Institute); "Hygiene and Sanitation" (Sgt. Murray, medical orderly); "Herd Testing" (LAC. Pollard); "Bee-keeping" (F/Sgt. Swain); "Insect Pests and their Control" (Mr. B. Gibbon, Cawthron Institute); "Apple-growing and General Orchard Work"; "Rubber-planting in Malaya"; "Dairy Herd Management." Guests from the Station Hobbies Club and the Station Discussion Group have at various times attended meetings. The club chairman is F/O D. F. Pennington, and the secretary F/Sgt. J. A. Hinton. In spite of the moving population of trainee station personnel, the club has at all times enjoyed a generous membership, the maximum being 26 and the minimum 10. The organising secretary, Mr. S. Freeman, paid a visit to the club during May.

WAIRARAPA.

Carterton.—Appointment of J. Rose to fill the position of chairman, which had become vacant. A. Fisher re-elected treasurer. Decided to institute a club library. Two debates held: (1) "That it Pays to Strip Cows," speakers, P. Gates, S. Rose, and D. Fell (affirmative); J. Rose, K. Ordish, and M. Bilton (negative); the affirmative speakers were given the award. (2) "That Land Girls Should be Admitted to the Club," B. McKenzie, J. Jones, and F. Ward (affirmative); A. Fisher, I. Ordish, and R. Rose (negative); the award was given to the negative. Mr. B. Brassel acted as judge. There was an attendance of 22 members.

Masterton.—Discussion on the recent field day, results of stock-judging competition, and club dance; profit on dance, £7 10s 11d. Exhibition of movie films by Mr. E. F. Wilson, showing the Continent, the Kruger National Park (South Africa), and scenes in New Zealand. Thirty-three members attended out of a total membership of 61.

MANAWATU.

Bunnythorpe.—J. Wood elected acting chairman. Lecture by Mr. W. A. Jacques, of Massey College, on "Tillage and Erosion." Eleven members present.

Rongotea.—Meetings to be commenced at 7.30 p.m. during the winter months. Lecture by Mr. J. Hill-Motion, veterinarian; Mr. Hill-Motion spoke on "Diseases of Farm Animals," and briefly outlined the veterinary service. Eighteen members present out of 28.

WANGANUI.

Bulls.—Final arrangements for annual dance. Good attendance of new members. Presentation to W. Jurgens, one of the club's foundation members, who had completed his training at Ohakea R.N.Z.A.F. Station, where he recently assisted in forming a Young Farmers' Club. Members of the Ohakea Y.F.C. were present by invitation. A lantern lecture on "The Diseases of the Dairy Cow" was given by Mr. J. Hill-Motion, veterinarian; the speaker dealt mainly with such matters as mastitis, abortion, eczema, and milk-fever. There were 19 club members present, besides visitors. Officers elected at the recent annual meeting: Advisory president, Mr. A. D. Young; chairman, P. Anderson; secretary and treasurer, R. I. Jamieson.

R.N.Z.A.F., Ohakea.—A club was formed recently at this station, meetings being held weekly. Club secretary, LAC. Douglas, H. G.,

G.T.S., R.N.Z.A.F. Station, Ohakea. A very good response has been made so far as membership is concerned.

SOUTHERN HAWKE'S BAY.

Dannevirke.—Five new members enrolled. J. Hartridge and M. Le Livre appointed delegates to the Gift Stock Committee of the Farmers' Union. Arrangements completed for transport to the Southern Hawke's Bay District Field Day at Woodville. The first series of 3-minute talks by High School members was held; the competition is for a prize donated by two of the advisory members. Speakers and subjects were: J. Duigan ("Sheep Shearing"), P. Wakeland ("Regrassing Depleted Areas in Central Otago"), J. Johns ("Bearing Trouble in Sheep"), K. Hastie ("Concrete for the Farm"). The best speaker from each meeting will take part in the final to be held at the last meeting of the season. The Mayor of Dannevirke gave an address on "The Correct Procedure of Running a Meeting"; the speaker covered many points in an interesting manner, and the club hopes to benefit from his advice. Thirty-nine members present out of a total of 55.

TE KUITI.

Otorohanga.—Discussion on proposed radio talk; suggestion that the talk deal with the matter of girls joining the Y.F.C. This was put to the meeting and lost. Discussions re Ruakura field day, and the question of sending delegate to Farmers' Union Special Committee. In connection with the impromptu speeches and debates for the Rose Bowl, it was decided that there would not be sufficient meetings for the contest to be held. Officers elected at the annual meeting: Advisory president, Mr. Noel Tipping; chairman, J. Reed; secretary, G. Clark; treasurer, W. Staite. Sixteen members present.

Paewhenua.—Report on annual ball, which proved a financial success. Parcels to be sent to two members serving overseas. Dog trials to be held on forthcoming field day. Nineteen members present out of 21.

WAIKATO.

Cambridge.—Welcome to Pte. C. Todd, recently returned from service in the Pacific; he was made a life member of the club. Pte. Todd suitably replied and thanked members for the cake and parcel received overseas. Report by the chairman on the annual meeting of the Auckland Council. Report on field day recently held at St. Peter's School Farm. Lecture by Mr. Bowan, veterinarian, on "The Ailments of Dairy Stock at Calving Time." Twenty-one members present out of 40; four new members enrolled. At previous meetings lectures were given as follows: Mr. R. S. Entwhistle ("Conduct of Meetings" and "Farm Book-keeping"); Mr. Roach, of Ruakura ("Tree Planting").

Te Awamutu.—This club has recently been revived, after having been in recess for over two years. The following officers have been elected: Advisory president, Mr. A. S. Wylie; advisory committee, Messrs. J. S. Pattison, M. Dodson, G. Donaldson, W. H. Benson, H. R. Clarke, E. Fraser, W. McKinnon, and M. Lorimer; club chairman, C. W. Eyre; secretary, E. V. Fitzpatrick; treasurer, D. Dodgson. At the inaugural meeting the advisory president, Mr. Wylie, and Mr. W. H. Benson (formerly a member of the Wellington Y.F.C. Council), spoke on the activities of the clubs throughout the Dominion. Mr. M. E. Dodson, veterinarian, gave an address on "Artificial Insemination and Animal Genetics." The club has now a membership of 40.

ROTORUA.

Okoroire.—A club has been formed at Okoroire with an initial membership of 24. The following officers have been elected: Advisory president, Mr. W. B. Hardwick; advisory members, Messrs. Geo. Coats and R. K. Reynolds; club chairman, L. V. Watkins; secretary, W. G. L. Ring; treasurer, R. J. Makgill. Mr. D. S. Ross (immediate past president of the Y.F.C. Federation) and Messrs. Nichol and I'Anson, Bay of Plenty, attended the inaugural meeting, and spoke on the aims, objects, and activities of the Young Farmers' Clubs.

BAY OF PLENTY.

Kati Kati.—Discussions regarding the debating contest and ensilage competition. Decided to enter a team for the football tournament. Address by Mr. H. B. Capamagian on his experiences overseas. Sixteen members present out of 20.

Paengaroa.—One new member enrolled. Four practice teams selected from which the debating team for the district contest will be chosen. The team to represent the club in the Gulliver Cup was selected as follows: I. Spratt (sheep), B. Vant (cattle), J. Gulliver (pigs). Mr. Searle gave a most interesting and informative address on "Farm Finance." Twenty-nine members present.

Pukehina.—General discussion. Address by Mr. D. S. Ross (immediate past president of the Federation) on "Increasing Production"; Mr. Ross gave some very valuable information and advice. Eleven members present out of 14.

Tauranga.—Committee set up to arrange for the forthcoming field day. Team selected for judging in the Gulliver Cup competition. Essay by J. Wright to be forwarded to District Committee for approval; if suitable this will be broadcast over 1YA. Decided to hold a club ball. Impromptu speeches were given by members and Mr. P. Keenan (schoolmaster) gave a number of hints on speech-making, and picked nine members out of those who had spoken. These members were invited to his home, where he would select three for a debating team. The team finally selected was as follows: J. Wright, L. Wilson, and A. Talbot. Twenty members present at the meeting.

Te Puna.—Arrangements for practice debate. All members present took part in impromptu debate, each member speaking for two minutes. Fourteen present.

Te Puke.—Report on the District Committee meeting by P. Nichol. Interesting and instructive talk on "Farm Finance" by Mr. George (bank manager). Nineteen members present out of 24. Officers elected at the annual meeting: Advisory president, Mr. D. S. Ross; advisory members, Messrs. W. Nichol, A. Gordon, M. G. Cruickshank; chairman, G. Nicholls; vice-chairman, A. Coffin; secretary, E. Melton; treasurer, B. Bragg.

Whakatane D.H.S.—Business meeting. District Committee to be approached regarding memorial to members in the district who had made the supreme sacrifice. Club to visit the Dairy and Pig Farm at Edgecumbe. Thirty-four members present out of a total of 52.

NORTH AUCKLAND.

Kaukapakapa.—Report on annual dance; a slight profit was made. Mr. B. Harvey, manager, Kaipara Co-op. Dairy Co., addressed the meeting on "Dairy Factory Management," dealing with the care of cream, and such matters as bacteria, etc. Sixteen members present out of 48.

Whirinaki.—A club has been formed among the young Maori farmers of the Whirinaki Settlement, with an initial membership of 16. The club is under the direction of the field officers of the Native Department.

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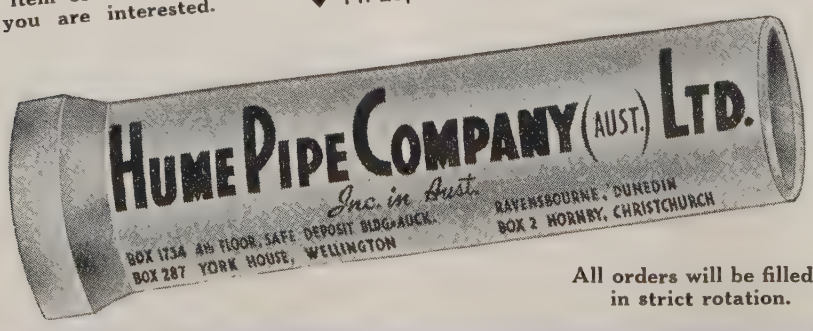
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Copper	545.000	9 " "
Coal	88.700	1½ " "
Glass	180.700	3 " "
Gold	1200.000	19 " "
Iron	483.000	8 " "
Lead	708.000	11 " "
Limestone ...	197.000	3 " "
Masonry and cement	140.000	2¼ " "
Steel	486.000	8 " "
Tin	452.000	7 " "
Zinc	445.000	7 " "
Coke	62.400	Same
Oak	54.000	9/10 as heavy
Oil, petroleum	55.000	9/10 " "
White pine ..	34.600	½ " "

Health Notes for the Farm

Scarlet Fever is Highly Infectious

Contributed by
The Department of Health

SCARLET FEVER has been about to a greater degree than usual lately, and parents would do well to be on the look-out for it. It's one of those highly infectious diseases that people catch easily when exposed to it, and the best means of escaping infection is to keep away from contacts. Ordinarily scarlet fever doesn't give cause for any undue alarm; properly treated it's rarely little more than an upset. On the other hand, it can have complications of a decidedly serious nature if you take chances with it. And with young children there is sometimes a tendency on the part of over-indulgent parents to take chances, to give way to the child's persistent demands to be up and doing when the rash and fever have cleared up. It is at this period that quiet convalescence is essential, in order to avoid any strain on the heart or kidneys.

How Infection Spreads

The cause of scarlet fever is a germ of the streptococcal family, which resides in what is known as the nasopharynx—that is the back part of the mouth which is common to the nose and the throat—and also lurks in and around the tonsils. It will also be present in any discharges from the nose or ears. Infection spreads through personal contact with infectious droplets from the mouth or nose of a carrier. A child who comes close to another who is in the early stages of scarlet fever will be peppered by these droplets and will be in serious danger of an attack. Infection is also possible at another stage of the disease—the spread from the convalescent carrier. Some patients remain infectious for a while after recovery. They are mostly those patients who have had complications, such as chronic nasal discharge, ear discharge, inflammation, and swelling of the neck glands, or perhaps chronically enlarged tonsils and adenoids or abnormal nasal conditions. All these come under the heading of complications.

Symptoms

There's usually a 24 hours' warning of the onset of scarlet fever. The early symptoms are a sore throat, a headache, a temperature, or a feeling of nausea and vomiting. These are characteristic signs, and if they show up in any child when there's scarlet fever in the vicinity, keep him home. Treatment is a matter of bed, rest, and the use of drugs and serums that the doctor may advise. Following the preliminary stages, after a period of about 24 hours the next sign is a bright scarlet rash; it might be described as a scarlet flush of the skin, with minute spots of intense redness superimposed. It appears first on the face, and then as a pinpoint rash on the neck and chest. It doesn't stop there, however. It creeps on gradually over the body and thighs and then over the arms and legs. It is naturally highly disfiguring, but fortunately it usually lasts only for two or three days, and then starts to fade, finally disappearing on the sixth day. Skin peeling, which starts after the first week, is usually finished by the fourth week. And incidentally, the skin flakes that peel off are **not** infectious, as many people think.

Isolation Essential

The patient needs at least three weeks' isolation and care after a bout of scarlet fever. This serves two highly important ends: it ensures that the patient won't develop any unpleasant consequences, and it also prevents him from infecting others.

If the patient is nursed at home, it is most essential to take certain precautions. He should be isolated in a separate well-ventilated room, separate utensils should be set aside for his use and disinfected or boiled after use. Nothing should pass out of the room unless disinfected. Also, the person attending the patient should wear a gown on entering the room, remove it on leaving, and wash the hands with soap and water before leaving. Thorough scrubbing of the hands is most important. And visitors should be strictly barred.

But all that trouble isn't necessary if people will only take proper care, on the lines suggested. That is to say, keep infection away from the healthy, by keeping the scarlet fever patient thoroughly isolated until the danger of infection is over; that is, three weeks from the onset.

Child contacts should stay away from school for seven days if the patient is removed to hospital; or, if the patient is nursed at home, until he is released from isolation.

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B 167: Folding High Chair.

Although light in weight, it is very sturdy and well braced. It locks in position, and as an extra precaution has a safety latch. Constructed of well-seasoned timber, enamelled in a selection of pastel shades.

E. Le Roy Ltd.

Dept. D.A., P.O. Box 780, 81 Queen Street, Auckland

Women's Land Service

The Land Army in Britain

Like every other great organisation, the Women's Land Army in Britain has been having its share of criticism. It is interesting to mention briefly what their members do on farms, and their value to their country. The following extracts are taken from an authoritative article by Charles Graves:—

THERE are well over 50,000 Land Girls in Britain. Generally, the Women's Land Army is employed on farms, market gardens, and in forests all over England and Wales, the various categories including milking and dairy work, general farm work, timber production, tractor driving, fruit and vegetable cultivation, the care of livestock, and field work. Volunteers employed in timber production are seconded to the Timber Corps and have a preliminary month's training.

All volunteers must promise to serve for the duration of the war and to give full-time mobile service. Besides public holidays, they receive a minimum period of one week's holiday per annum and an unspecified number of weekends. This may be supplemented by an interval between jobs, in which case the Land Girl can elect to return home or receive 5s a week in addition to her free board and lodging locally. Normally the pay is 18s a week, plus this free board and lodging, or £1 18s if not billeted by the employer.

Probably the coldest work—and certainly the longest hours—falls to the lot of the milkers. They have to get up at 4.45 a.m. and do a 12-hour day. The tractor drivers get up at 6.45 a.m. and are expected to be in the fields at 8 o'clock. And yet, though the Women's Land Army is mostly drawn from the towns, it is not an exception for mannequins, typists, and other girls who are used to indoor life to become outstandingly efficient at such jobs as tractor driving.

Probably the hardest work of all is that of pulling sugar beet. This is regarded as a heavy job even for men. Nevertheless, the efficiency of these Land Girls is such that they are substantially responsible for Britain's sugar ration, all of which is home-grown nowadays.

Town-bred girls also seem surprisingly smart in quietening cattle. On several occasions a Land Girl has "saved the boss from the bull," and in many other cases, particularly in Kent, Land Girls have gone on milking while bombs were crashing in the neighbourhood and, having ducked underneath their tractors when being actually machine-gunned by low-flying aircraft, have continued ploughing as soon as the fuss and rumpus were over.

Grace Harrison received the M.B.E. for continuing her duties as a Land Girl on the farm near Dover closest to the long-range German shells fired across the Straits.

Actually, thousands of girls have really grown to love their work on the land, a proof that farming is a vocation rather than just a means of earning a living. Many of these girls are hoping to take up farming as a career, yet no doubt some of them will provide the farmers' wives of the future.

Dear Land Girls,

I trust that the majority of members have seen the initial issue of our page in last month's "Journal of Agriculture" and that you are pleased with it. Any suggestions for the page will be appreciated, and now I am expecting to receive contributions from one and all. Remember to have them in by the 10th of each month.

Those of you who are working on dairies will probably be feeling the cold these days. You have my sympathy, but there is consolation in remembering that you are doing a very necessary job. A man in the army is no use unless he can be fed. Therefore, if by working in a dairy you are helping to produce milk, butter, cheese, and bacon, despite the sometimes arduous nature of your work you are doing a job of which you can be proud.

If at any time you want information on, say, beauty hints, knitting instructions, or things of that kind, write in and I shall do my best to find the answer to your problem.

Best wishes to all,

M. MALEMPRE.

SIMPLE BEAUTY HINTS

DO you ever suffer from eye-strain? In other words, do you do the wrong thing and read in bed? A weak solution of cold tea will work wonders for tired eyes, and will also help to prevent wrinkles around the eyes.

Have you been picking beans lately, or digging potatoes? If you have, your back has probably rebelled at the unaccustomed work. Half a pound of Epsom salts put into a hot bath will ease these aches and pains. Have it really hot and soak in it.

How are your hands? Getting rough, no doubt, from the outdoor work. A simple remedy may be made by squeezing lemon juice in the palms of the hands, then sprinkling liberally with sugar. Rub in well, then wash off with warm water.

If your feet are sensitive, put two teaspoons of salt into a basin of warm water. Soak your feet for about five minutes, and you will be surprised at the relief you will feel. To prevent your feet from rubbing and chafing when you wear heavy boots or shoes, rub them with a little methylated spirit each night. This will help to harden the skin.

BEWARE OF LIME!

JUST a hint to any of you who have to use lime water in cleaning poultry houses. It sometimes happens that in doing this job—a most necessary one—a little lime water may be splashed on the face and sometimes into the eyes. Do not disregard this, for it can be very painful and if any quantity of lime gets into one's eyes it can be dangerous. If at any time this should happen to you, immediately wash your eyes in clean water. Blink your eyes rapidly, which will wash the lime water out and in five minutes the eyes will be clean and there will be no after effects.

THE GOOD NEIGHBOUR.

WINTER is here again, bringing with her not only frost and sunshine, sleet and tempest, but also numerous days when

"Quiet and grey is the sky;
Thin wisps of darker mist go drifting by
Blown by the white flame of wind.
Silent and still the earth,
No sound of joy or mirth,
No gay spring song of bird,
No glad sound may be heard—
Only the low, soft whisper of the wind."

Many folk are depressed by this "in between" kind of weather, which is neither fair nor stormy, but of an indeterminate greyness; it seems to emphasise the monotony of their lives and is symbolical of frustrated hopes and dreams that lack fulfilment. Blinded by self-pity they have no eyes for the quiet beauty of the scenes about them and count the world a drab, uninteresting place. Yet this very lack of colour holds a serenity and loveliness all its own. Have you never watched the "dark feathers of smoke" curling from the chimneys or the changing, silvery patterns wind-ripples weave among the grasses? Have you never seen the slow clouds gather over the distant ridges till sky and hills and misty valley mingle and merge in a shadowy curtain of rain? Have you never walked along the sands at low tide, with only the plaintive gulls for company, and looked upon the sea lying grey and smooth and gleaming as a pearl? If yours is a "seeing" vision you cannot gaze on such things without experiencing some measure of inspiration and surcease from worry. Your cares are lightened as you feel the "grey, light drift of the dust in the keen, cool rush of the air" and you value at their true worth those tranquil periods when time moves leisurely and life's restfulness and haste are stilled.

Those who have known great sorrow welcome grey days. Peace and healing come in their wake, whereas blue skies and brilliant sunshine often serve to make grief more poignant. It appears as if Nature were in tune with our souls and had changed her garb to suit our mood. That is why grey days, though infinitely beautiful, are just a little sad. Yet we would not wish them to be otherwise, for in their restful beauty we have opportunity to find ourselves and readjust our relationship with God and man.

Mary

Grey Days

Knitting for the Army

Plain and purl and purl and plain,
Then turn, and purl and plain again,
And slip a stitch, knit two, and then
Just do all this till ten times ten;
And when it measures miles or more,
Repeat it all just as before,
Till caps and socks all leap and bound,
And body-belts spin round and round.

At last the rows begin to rhyme,
With lively stitch tunes keeping time,
So purl the crochet, plain the quaver,
Every line without a waver.
Bang! Up strikes the big bass drum,
And all alive the stitches come,
And khaki soldiers' straight and fine
Are marching, marching, line on line,
Now plaining forward, purling fro,
All row on row, and row on row.

So LEFT the crochet, RIGHT the quaver,
Let the long lines never waver;
Ev'ry man and ev'ry stitch
Is heeled and toed without a hitch;
In mass formation tanks and guns
Are purled in fours and plained in ones,
And while they quick-step to the bands
Whole armies march between my hands;
So bombs may burst, and guns may roar,
But knitting pins will win the war!

ETHEL SMYTH.

Adventure Tales

IF YOU like a story containing plenty of incident coupled with skilful character drawing you will enjoy "Burmese Picnic," wherein Dorothy Black writes in her usual vivid fashion of people and events in Burma just prior to the war. Her use of picturesque phrases of Burmese speech and her portrayal of native customs and beliefs, as instanced by the appearance of the local "nat" (or spirit) in the form of a little white dog which saves the life of the hero in a dangerous crisis, add greatly to the atmosphere of the tale.

Take a charming young American girl; a dark-skinned villain of a schooner captain with a penchant for fine books and etchings; an eccentric woman explorer; the beautiful, cultured, but strangely enigmatic widow of a famous governor, now devoting her talents to helping the traitorous son of the man she really loved; British and American naval intelligence officers working together to discover the whereabouts of a mysterious supply base for German U-boats and the source of persistent leakages concerning Allied shipping movements—set your cast against the exotic, tropical background of the West Indies, and you have the principal ingredients of Denis Rooksby's adventure novel "Spanish Waters." The scenes depicting a fire at sea and the long journey adrift in a lifeboat, and the English officer's breath-taking escape from the enemy's precipitous island stronghold and the subsequent capture thereof by a U.S. destroyer, are particularly well described. Mr. Rooksby presents an able case for closer Anglo-American co-operation in colonial affairs.

Shorn by the frost with a crystal blade,
The dry leaves, scattered, fall at last.
—From the Chinese.

"When that great day comes...."

And that great day **will** come. When hate is turned to love . . . war to peace . . . and dreams to reality.

And your dreams of plenty will come true, too. The day that you dreamed of Onehunga blankets in your own home is not far distant, for even now Onehunga Mills are releasing a limited supply of their famous products for civilian needs, and your "hope chest" may soon receive its quota of those precious Onehunga Air-Cell or ordinary blankets, whose quality has been so well worth waiting for.

ONEHUNGA

ONEHUNGA BLANKETS —— AIR-CELL BLANKETS —— ONEHUNGA WOOLLENS & TRAVEL RUGS. Distributors: SARGOOD SON & EWEN LTD.

How I Spend the Winter Evenings

PERUSING the entries for the competition this month proved a very pleasant way of spending a winter's evening. I found that reading held pride of place as the most popular occupation, with knitting and the kindred arts of sewing and weaving a close second. It is good to note that although the radio plays such an important part in our present-day life, both from the educational and entertainment standpoint, it has not entirely displaced the performance of music in the home by the individual.

Congratulations to "Friend," Whangarei, on the constructive ideas expressed in her essay, which gained first prize. "Bry," Eltham, and "Darky Top," North Auckland, tied for second place, and "Mrs. 60" was highly commended.

First Prize

WINTER evenings and a big open fire with those golden-copper tongues of flame in ever-restless mood reaching for the chimney and casting about them a cheerful glow and warmth. As we gather near the friendly fire the long winter evenings hold no boredom for us. We all have our hobbies. Father has his paper and some books on roses nearby; the boys are busy with their jig-saws, fretwork, and stamps; and I—well, sometimes I play the old familiar songs of yesterday, and the lusty voices of the family join in, a happy and impromptu choir.

Since this is wartime so many of my evenings are spent knitting for the "boys over there." As my fingers swiftly move my thoughts travel even more swiftly to the days when those boys will be home and the reconstruction of our system of living begins. If peace is to be permanent we must all help solve the problems of distribution, for in this world of plenty Mother Nature meant all her children to have their fair share. So as I voice my thoughts aloud Father puts down his book, the lads cease their playing, and we plan for those days ahead.

Many a pleasant hour have I enjoyed with a basket of shells from a nearby beach and a loaf of bread—making flowers! It is a fascinating task and although Nature may not recognise some of the blooms, they make nice ornaments and find their way into many a Christmas stocking.

Reading constructive articles gives never-ending satisfaction, developing our minds and broadening our outlook on life and our attitude towards our fellow-men. Through the medium of radio we listen to voices in far-away lands which this wonderful age of invention has now brought near.

Some happy times are spent with pen and paper "chatting" to our boys overseas. Thinking of them makes them seem nearer. There are snaps to arrange in the album, too. What memories they hold! Then there is my tatting and embroidery work, but that must wait till the knitting is done. "Never an idle moment" is quite a good slogan, for with the mind and fingers occupied with something constructive good will result and our mental and physical health benefit. Spend the leisure hours well and we reap the beautiful harvest of inner peace and contentment.—**"Friend," Whangarei.**

Second Prize:

TO me winter evenings are inescapably connected with travel books and consequently long, glorious hours of delightful and instructive reading. What interesting discoveries I make and, while the firelight flickers on the wall, what countries I visit and explore, what beautiful sights I marvel at, and what strange people I meet. Such reading always suggests the fanciful use of my well-worn, much-pencilled atlas, so with frequent use of that lovely word "via" I, with Little Sister's imaginative help, plan once more an absurd world tour. The pleasant hours pass lazily, until I become guiltily aware of the "things I should do," so I elevate the uninspiring commonplaceness of mending with the instructive enjoyment of an excellent radio programme.

Sometimes I am inveigled into constructing card houses. Then just as I am thrilled with the clever achievement of a completed building, my helper wants to blow and blow till the cards scatter everywhere. . . . . "Snakes and Ladders" are then produced and for a short time life is suspended between escaping a venomous snake or scaling a miraculous ladder.

One of my recognised activities is putting snaps taken during the summer into the photo album. They make my camping holiday vividly real again, but how I shudder at the

happy groups of scantily attired bathing enthusiasts!

Friendly discussion, letter writing, a general knowledge quiz, or a jigsaw puzzle definitely belong to a winter evening, and in the quiet cosiness I am contented with such activities.

Then as the fire gradually becomes lower I invariably peer into the ashes to find cows, mice, and tables, or other mysterious shapes. . . . .

Thus my evenings—how immeasurably they compensate for the chilling, sombre greyness of the winter days.—**"Bry," Eltham.**

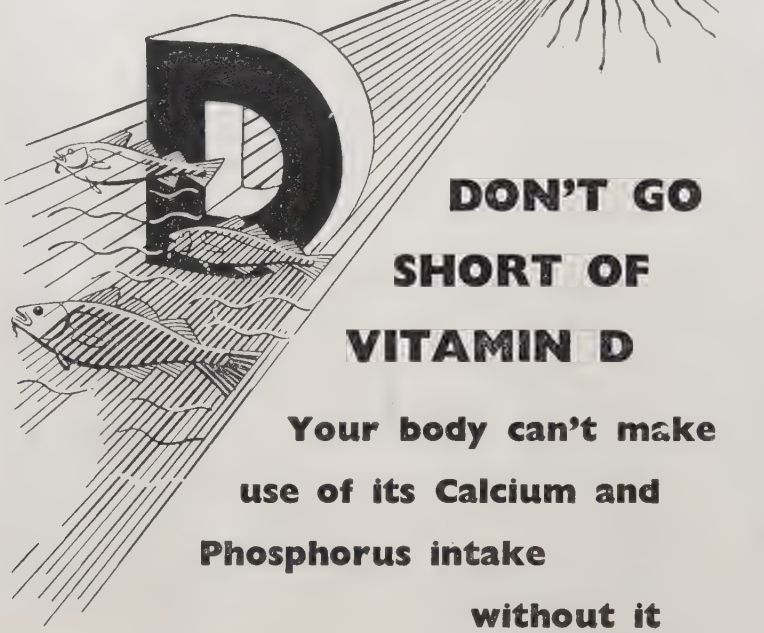
Second Prize (Equal)

SUMMER days are gorgeous, but winter evenings have a charm of their own, for it is then, by a log fire, that one can indulge in those hobbies in which one is interested. I seek my rest and enjoyment in a complete change of work, handicrafts interesting me most. My present pastime is making use of wool straight from the sheep, and after much labour I span sufficient wool to knit a cardigan. Then came the dyeing. In great trepidation I plunged my valued cardigan into a bath of dye and stood by while it boiled, expecting to see it shrink into a doll's garment, but it came forth the right size and bright in hue.

For a long time I have longed to make a hearth-rug. After searching I found a piece of scrim about 5ft. by 4ft. and soon had a design drawn on paper with crayons. This had to be marked on the scrim in bright pieces of wool, and soon I was absorbed in my work. Then I had to dye little bundles of wools, some weird and wonderful shades emerging! These were combed out and worked in and then there were more bundles to dye.

ISSUED BY THE DEPT. OF HEALTH

THIS WINTER-



DON'T GO SHORT OF VITAMIN D

Your body can't make use of its Calcium and Phosphorus intake without it

Lack of Vitamin D will show for certain in weak bone formation and poor stature, no matter how good the rest of your diet. This lack will delay the growth of permanent teeth in children, and when they do come, their protective enamel will be poor.

Sunlight is the source of all Vitamin D, but you don't get enough in winter. Now, Nature has stored rich concentrations of Vitamin D in the liver of certain fish, so it is quite easy to make up the shortage.

You can't get enough Vitamin D from ordinary foods. Even in peace time, a New Zealand diet survey showed a big average deficiency in Vitamin D.

FISH LIVER OILS COME TO THE RESCUE

These amounts of Cod Liver Oil will redress the balance, and build bone and teeth—

- For very young children (beginning from one month old) — 1 to 2 teaspoons each day.
- For older children and adults — 1 teaspoon a day.

Start children very young and they will not dislike the taste. For those older ones who find Cod Liver Oil unpalatable, there are brands of malt and Cod Liver Oil, and other fish liver oils in capsules.

Get what sun you can (even in winter) but for safety—

take FISH LIVER OILS

23

FOR A HEALTHIER NATION

After many hours of work my mat is about three-quarters finished and looks very cheerful with its gay central colours bordered by brown. The next rug I attempt will be floral in design. I can hardly tear myself away from this slow but fascinating occupation.

Other not so interesting tasks which must be done include darning and mending. These can be helped along by listening to an enjoyable broadcast. Some evenings must be given to letter-writing and some to reading. When we think of the sufferings of the peoples of Europe how grateful we should be for our freedom, our homes, and firesides.—**"Darky Top," North Auckland.**

Competitions

August

Have you sent in your solution in answer to this month's competition query—"What do you do to cure the blues?" Entries close on August 15.

September

The subject of dreams has always been of interest to the human race since the beginning of time and the ancients set much store by those who could interpret the images visualised by the mind in sleep. No matter how deeply you slumber you are sure to have an occasional dream. Perhaps you would like to jot down the most vivid and unusual of your experiences in this connection.

"STRANGE DREAMS."

10/- will be awarded as first prize and the second is 5/-, entries to be in by September 15.

"MARY,"
C/o. "Journal of Agriculture,"
P.O. Box 3004, Wellington.

Highly Commended:

PERHAPS you would like to know how a "night-blind" woman manages really to enjoy her evenings—the ones at home as distinct from those spent with friends or at some entertainment. The radio, of course, is a great comfort and being debarred from reading I have become a serial fan. So I sandwich my time between listening and doing little jobs. Somewhere about 8 o'clock I usually turn off the radio and my companion reads to me—always a good travel book or biography, and I make rough notes on the points I particularly wish to study. My old lady isn't a very good reader and I have to do lots of rapid adjusting over pronunciation and foreign quotations. I never miss the 9 o'clock

news with the commentary to follow. Although I have a loved son in the firing line, I decided right at the beginning of this war that I would not lie awake worrying; I would learn Maori, something I had always wanted to do, but had never done. So behold me with a Maori grammar and a faithful magnifying glass painfully doing a few minutes' study and slipping into dreamland still amusing myself by concocting choice sentences to try out on the next accommodating wahine I chance to meet!—**"Mrs. 60."**

AFTER the manifold tasks of a farm wife's day the knowledge that the next few hours are my own gives me a feeling of content. Carefully closing the doors to deaden the sound I try to play the piano. Unable to learn when young, I now try to teach myself. I do not suppose I will get very far, for now the "time" is puzzling me and it seems almost impossible to play any but the very easy first exercises with both hands at once. Still I mastered the five-finger exercise, though at first both thumbs would insist on going together instead of right thumb and left little finger. It gives me great pleasure just to hear the notes in the little exercise, especially the bass notes, and it certainly makes me appreciate a good pianist when I hear one.—**"Kate," Auckland.**

DURING winter evenings I turn to my books, the books that have so often looked reproachfully at me during the busy summer months. I hear them say: "Here is the fire, here the chair, time is here, and we are waiting to talk to you." Listening to music, the news, or a play, darning and sewing, and in between times spending long hours with these silently-waiting friends, winter is indeed our mental and spiritual harvest time of the year.—**"Jonathan."**

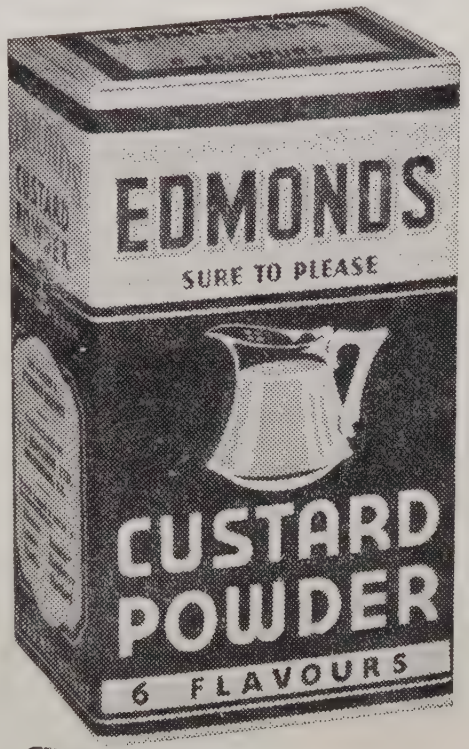
THE cold, bleak winter's day comes to an end and gladly I draw the curtains, shutting out a dismal view of sodden garden and storm-tossed trees. How comforting to relax in my cosy old chair and watch a big wood fire which hisses and splutters or makes soft purring noises, very soothing to a tired person. As I sip my cup of hot tea I delve into a garden catalogue and figure out how much I can spend on bulbs and plants. In my mind's eye I can see them blooming in the spring. Then I settle down to a quiet read, the engrossing story of a botanist and his travels in the Tibetan uplands in search of rare and beautiful plants. Those same hills today are the scene of battle and destruction, and I offer a prayer of thankfulness that in this country we are spared the actual horrors of war and can spend our evenings in comfort engaged in homely tasks.—**"Vista," Waikato.**

THERE is always sewing, mending, knitting, and writing to be done, and we are fond of reading, study, and discussion together. But invariably the first part of the evening is taken up with: "Mother, will you read a story before bedtime?" and I am thus reminded of the delightful picture "penned" by Longfellow and entitled "The Children's Hour."—**"April Maid," Nelson.**

Little Things

She said, "I cannot understand
Your passion for these little things."
O, I shall never make her see
How heartbreaking and dear to me
A seagull's footprints on the sand;
A feather from a ring-dove's wings;
The way the rose-red anthers grow
On scabious flowers, purple-blue;
The glory of a flake of snow;
The colour in a drop of dew;
Striped velvet of a bee's brown coat;
The little pinky paws of moles;
Sunlight upon a pigeon's throat;
The little lovely secret holes
Of wood-wren's nest and field-mouse run;
The curve of rose petals; the back
Of ladybirds, bright red and black;
The silken touch of thistledown;
A fleck of sea-foam in the sun;
Pebbles in pools, all wet and brown. . . .
O, will she never, never see
How great these little things can be?

—Teresa Hooley.



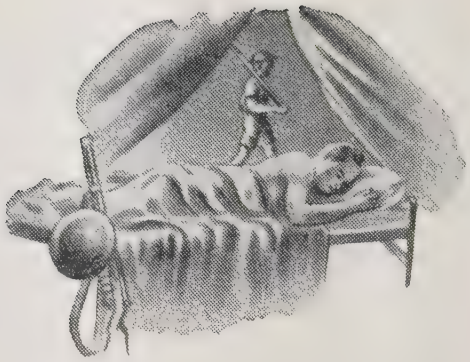
How to solve the CREAM PROBLEM This Winter!

The rich, creamy taste of Edmonds Custard is delicious...make big jugs of it and serve hot or cold, in place of cream. So economical... 1 dessertspoonful makes one pint! In six flavours.

A product of T. J. Edmonds Ltd., Christchurch.

26.4B

Twice in a lifetime



HE was just a little fellow a dozen years ago.

Too little to know — or care — that even as he slept, Frigidaire men in a distant laboratory were putting the finishing touches on a special new refrigerant later given the trade-mark, "Freon".

Much too little to understand that the real reason for developing this new compound was the safety of just such sleeping youngsters as himself.

He is grown now, and off fighting for his country on a South Pacific island. He is old enough to know that one of his deadliest enemies there is the mosquito, carrier of malaria.

The interesting thing is that it is "Freon" that now comes to his aid. Twice in his lifetime, this one result of Frigidaire research is paying off in personal protection for him and his kind.

For when mixed with chemicals to kill mosquitoes, this compound makes a new and better kind of insect spray. Unlike heavier sprays that fall to the ground, it evaporates almost instantly, leaving the mosquito-killing compounds floating suspended in the air.

"Freon" was not developed as a war product. It came about because Frigidaire, seeking to provide more and better things for more people, never stopped trying to make better refrigerators.

But because it was known and familiar, it was available when the war need appeared — just as it remains at hand for future peacetime developments.

Frigidaire

Division of General Motors (N.Z.) Ltd.

BEDS AND BEDDING

WITHOUT restful sleep none of us can do work or be healthy, happy, and pleasant. The average grown-up sleeps eight hours out of every 24. The amount of sleep one needs depends upon the individual. But how well one sleeps is important, too—more important than how long. Three or four hours of restful sleep are worth more than eight hours of poor sleep.

Few of us know, or even suspect, that we may not be getting restful sleep. To plan for good sleep we need to know what makes it possible to get it and what may keep us from getting it. Discomfort, noise, tenseness, all hinder good sleep. A good bed may help to get rid of all these. It invites restful sleep and gives support to the body in its natural position. It does not sag, sway, or squeak, gives warmth without weight, is easily cleaned, and is durable. The choice of the various articles which make a good bed depends upon one's body weight, shape, and length, one's knowledge of what is good, the cash one has to spend, and what is available where one shops. Price is seldom a true gauge of lasting quality or comfort. The bedstead, springs, mattress, pillows, and coverings all add to or take from the comfort of a bed.

The bedstead is the foundation of a good bed. Beds come in several widths, but one should not habitually sleep on a bed narrower than 39in. unless there are side rails, as fear of falling off disturbs sleep. A bedstead should be light weight but firm in construction so that it can easily be moved. Simple, smooth lines will make it easy to clean, will not snag bedding, nor scrape the fingers when making the bed. The style depends upon the place it will occupy, other furnishings, and personal taste. Bedsteads without head- or foot-boards are becoming increasingly popular, as they save space and make rooms appear larger. The main objection to one without a footboard is that it does not hold extra covering to pull up during the night. A footboard also gives added warmth to the bed. However, such a couch effect makes a good foundation for the bed in a girl's room or where the living room serves also as a bedroom. A tailored slip cover makes it more suitable, and because such a bed is apt to have better and wider springs and mattress than the usual couch it is more comfortable. It is best suited to the twin or three-quarter size.

Bachache, headache, and tiredness might all be traced to a poor bedspring! Complete relaxation is important to restful sleep. Support of the body when lying down helps one to relax and is as important as good posture when standing. In a natural posture the spine remains straight when the sleeper lies straight on side or back. Good bed springs under a good mattress will make good sleeping posture possible. The comfort of a mattress depends to a great extent upon the springs. A sag or a hammock can be produced in a poor spring of any type. A good pillow supports the head yet allows the neck muscles to relax. It should be light, soft, and springy. More often than not it is too high or too hard or both, because it has too much or too poor stuffing. Many people prefer a very thin pillow or none at all. The comfort of a bed depends also upon the quality and size of the sheets, pillow-cases, and coverings, as well as how it is made. Buy sheets to fit the width and thickness of the mattress plus a tuck-under all round of at least 6in. A sheet 108in. long is best for all but children's beds. A good width for a single bed is 63in., for a twin bed 73in., for a three-quarter 81in., and for a double bed 90in. Sheets which are too small can be enlarged with parts of others or you can use new material of the same quality as those you wish to enlarge. Blankets can also be lengthened at the foot with flannel or other suitable material.

To Make a Mattress Cover

YEARS of life will be added to mattresses if they are given proper care. Always sun a mattress thoroughly and turn it several times while sunning it. To keep the mattress clean it is a good idea to make a mattress cover. Here are the directions:—

Material: Any washable cotton material of medium weight. 1½ yards of ½-in. cotton tape or 1½ yards hemmed ½-in. strips of cloth to use as tapes. Measure the mattress; add 2in. to the length and width as an allowance for shrinkage. Sew together the lengthwise edges of the other two strips. These are the top and bottom of the cover. Make ½-in. seams throughout. Strips torn from one of the widths of the top and bottom can be used to make the side strips or boxing, which should be as wide as the mattress is thick. This will ordinarily be 6in. Sew these strips together across the narrow ends.

Round off the corners of the top and bottom of the cover. Sew the side strip or boxing to the bottom piece all around, beginning at one corner. Pin the boxing to the top piece, being careful to see that the corners of the top are directly over the corners of the bottom. Sew round two sides and one end, leaving the other end open. At the open end cut the boxing at the corner so that the mattress can be slipped in easily. Hem all round the open end or bind it with a binding strip cut on the bias. Tack 9in. tapes at intervals of 2ft. across the open end, placing small squares of tape or cloth as reinforcement where tapes are tacked. Slip the cover over the mattress and tie the tapes in place.

Laundering Bed Linens

Washing.—Soak soiled bed linens in luke-warm water with soap for 15 minutes or so, and then wash. Soaking lightens your labour considerably, but stained articles should be washed at once, as soaking may set stains. Use a good, pure soap — plenty of it — whether you wash by hand or machine. In the washing machine do not try to do too many pieces at once. Give them a real chance to get clean. Whenever washing powders or fluids are used be sure to mix them with the whole tub of water before wetting the clothes. Never add them after the clothes are in the tub.

Rinsing.—Rinse first in clear hot water. Continue your rinsing in different waters till all the dirty water is out. White sheets should be given a blueing in the last, cool rinse-water.

Drying.—Sheets are best dried in the sun. Dry straight, not doubled over the line, if possible. Do not wring too dry. Moisture and sunlight are good bleaching agents. That is why sheets get so white in the sun.

Ironing.—When your sheets are dry fold them twice lengthwise, selvages together. The trick of ironing sheets and pillow-cases is to keep the hems straight and even. On pillow-cases work away from the closed corners.

Storing Linens.—Fold all sheets uniformly, twice lengthwise and as many times the other way as is useful to fit your shelves or drawers. Store them with the tabs to the front, so you can tell how many you have and how wide they are. Keep your linens flat and conveniently to hand in any place easy to reach, with ample room and protected from dust.

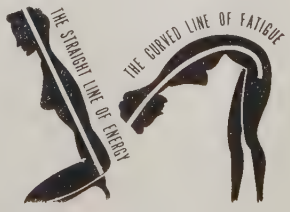
Kneel always when you light a fire.
Kneel reverently and thankful be
For God's unfailing charity,
And on the ascending flame aspire
A little prayer, that shall upbeat
The incense of your thankfulness
For this sweet grace
Of warmth and light.

—JOHN OXENHAM.

THERE'S A KNACK IN IT

So much has to be done. You go all out — and in no time you're 'all in'. Save your strength. There's a knack about most labour which once acquired lightens the work no end — and actually improves the figure. Stooping over with a curved spine simply invites fatigue. Remember, the straight spine's the strong line, whether you are standing, kneeling, bending or sitting. A slumped chest is cheated of its full supply of oxygen, cramped digestions can't work, strained back muscles develop aches. But . . . straighten that spine, pull in that chin, tuck that rear under like a spanked puppy (and when you bend, bend from the hips like a native woman, as nature intended you to do), and you can hoe in to your heart's content. You'll finish only pleasantly tired, not dragged down with fatigue and exhaustion. *And* — it's done the figure-work of beauty-exercises galore!

Berlei's five fundamental types and their variations came from the need for good posture, for only with good posture can you have better poise, carriage, health — and a beautiful figure. And only in your right type Berlei can you feel how wonderfully right Berlei is when they say "your Berlei is the fundamental foundation of good posture". Do keep on trying for your right type garment—it's vital.



Berlei
TRUE-TO-TYPE FOUNDATIONS

Mending Men's SUITS

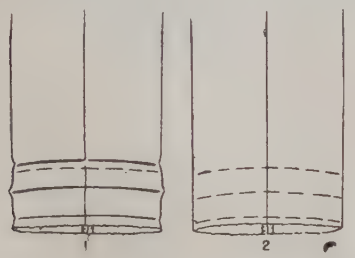
TROUSER ADJUSTMENTS.

When a man gains or loses weight or when a boy grows, trousers may need to be adjusted for good fit, comfort and better wear.

TO LENGTHEN TROUSERS.—Pick out the tacks at the sides of the cuff and rip open the lower edge. Spread the cuffs out full length. If the cuffs have never been repaired or adjusted, there will be three sharp press lines. The top crease marks the length the trousers have been, so measure from this line when you mark for a new length.

1. Measure down from the top crease the amount you want to lengthen the trousers. Mark around the leg with tailor's chalk. Steam out all old press lines.

Make a plain cuff or a French cuff, depending upon how much you are lengthening the leg. If 1 inch or less is being added to trouser length, finish again with a plain cuff. If trousers are lengthened more than 1 inch, finish with a French cuff.



2. From the chalk mark, measure down 1¾ inches and mark a line around the trouser leg. Mark another line 1¾ inches below that.

Pick up, fold, and baste along the middle chalk line. Pin the first and third lines together and baste. Steam-press.

Fold to form the new cuff along the line where the third and first chalk lines are basted together. Baste to hold the cuff in place and press.

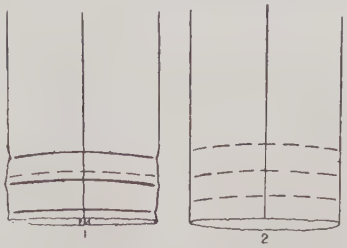
To finish the cut edge, which is turned up inside the trouser leg, turn the cuff down again, baste, and stitch it by machine. Finish with a wear guard, then tack the cuffs at the side.

FRENCH CUFF FINISH.

If you need to lengthen the trousers more than an inch, finish with a French cuff.

1. From the chalk line that is the guide for the new length, 2, strike two more lines—one 1¾ inches above the first line, one 1¾ inches below.

Fold on the centre line and baste. Lay this fold against the top line and baste. Fold and baste along the lower line, which marks the bottom edge of the cuff. Steam-press.

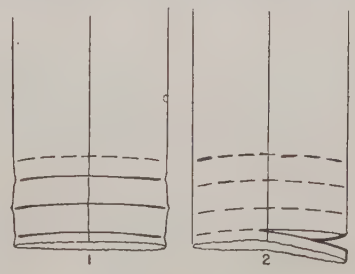


Turn the cut edge up inside the pants and turn in so that it just meets the top fold. Trim off any extra material. Join the two folds with hand stitches about one-fourth inch apart so they won't catch on shoes. Put in a wear guard. Steam-press and tack cuffs at the side.

TO SHORTEN TROUSERS—Pick out the tacks at the sides of the cuff and rip open the lower edge. Spread the cuffs out full length.

1. From the top press crease, which marks the old length, measure up the amount the leg is to be shortened. Mark around the leg at the new length with tailor's chalk. Steam-press to take out creases.

2. From the line just drawn, measure down and mark two more lines 1¾ inches apart. Strike a fourth line about 1½ inches below the bottom line and cut away all goods below this line.

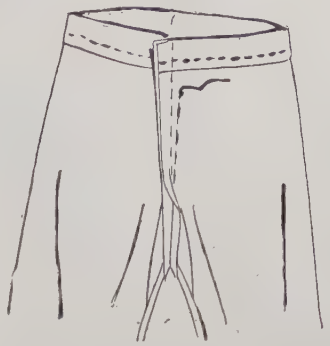


Finish as a plain cuff. Pick up, fold, and baste along the middle chalk line. Pin the first and third lines together and baste. Steam-press.

Fold to form the new cuff along the line where the third and first chalk lines were basted together. Baste to hold the cuff in place and press.

To finish the cut edge, which is turned up inside the trouser leg, turn the cuff down again, baste, and stitch it by machine. Finish with a wear guard, then tack the cuffs at the side.

LET OUT OR TAKE IN SEAT.—At the back rise of most trousers there is a generous seam allowance. Reseam along the back rise to make the seat smaller or larger as the need may be. Do this before you rip out the old stitching, then rip the old seam, and steam-press the new seam.



However, if there is some doubt about the fit, baste the new seam line, rip out the old stitching, and fit the trousers before stitching by machine.

LET OUT TOO-SHORT CROTCH.—Rip the inseams down from the crotch point about 12 inches. Open the back and front rise slightly—just so the seam allowances of the inseams are free. You will find plenty of seam there for this purpose if the trousers have not been adjusted before.

Let out the seam as needed and resew, tapering off to meet the old stitching lines of the inseams. Press open, then reseam the front and back rise, and press again.

Morning

If all of us were doomed to die
When we had lived a minute,
I think I know what Ann and I
Would wish to happen in it.
We'd let our sixty seconds run
Where chestnut blossom hardens
Some early morn, at Kensington,
When spring is in the gardens.

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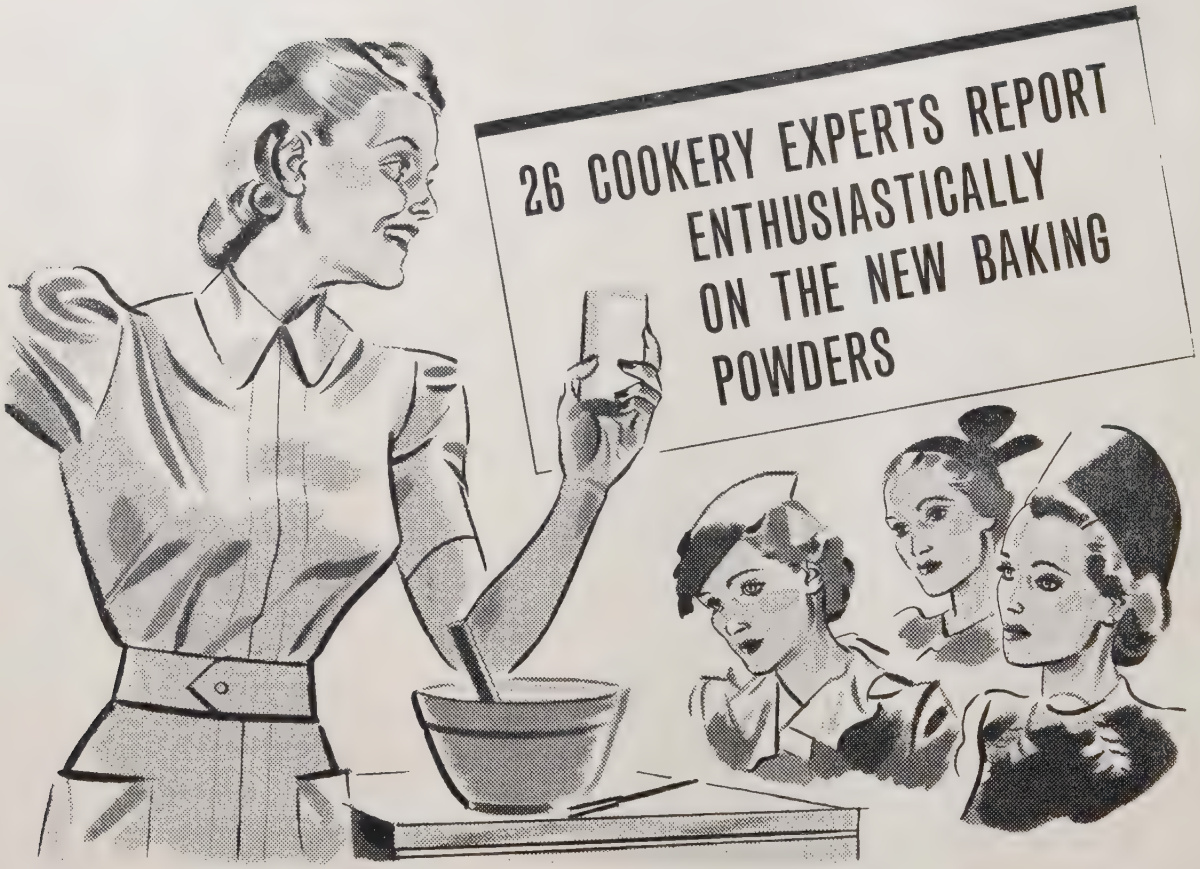

Samples of the new baking powders based upon pure food phosphate were sent to 26 cookery experts in all parts of the Dominion. They were invited to both use and mis-use it, and report their findings.

The sum total of their opinion was that as well as being better, the new phosphate baking powders are *foolproof.*

For instance, when as much as 25% more than the correct amount was deliberately used in tests, the results were still successful, and there was none of the after-taste usually associated with an overdose of baking powder.

But let one of the demonstrators speak for herself:

"*I consider the baking powder is excellent and enjoyed working with it. In cases where 25% excess baking powder was added no acid taste could be detected . . . Our conclusion is that the baking powder will provide very good results on all scores and that even allowing for slight irregularities in its use the (cooked) product was still of high standard.*"

A further reason why phosphate baking powders are foolproof is that they do not begin to "act" until they are in the oven. If you are interrupted for even a long time between the mixing and the cooking, no harm is done.

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Pure food phosphate for Baking Powder Manufacture is a product of Albright & Wilson and is distributed in New Zealand by Imperial Chemical Industries (N.Z.) Ltd., 16 The Terrace, Wellington.

Mary's at - Home -

I AM fortunate to live by the sea. This morning I went out for a few minutes. The sea was so tranquil—dark blue with two or three white waves close to the water's edge. The sky beyond was blue and peaceful, too. There was no inharmonious note. Whenever I look across to the horizon I think:

"There's a wideness in God's mercy
Like the wideness of the sea"

—a panacea indeed for our troubled times.—**Kay.**

THANK you for the recipes which give variety to our menus. Some time ago I boiled wheatmeal in water for a dessert and cooked rhubarb with it. We did enjoy it. It is necessary to put the rhubarb in with the wheatmeal to cook, otherwise it would not be soft by the time the meal is cooked.—**Joyce.**

MAY I join your "At Home"? A year ago I was a stenographer in a large city office—now I am a farmer's wife, and I love the peace and quiet of the country after the rush and bustle of city life. Each month since I have been on the farm I have enjoyed reading the comments in "Mary's At Home." "Young Mother" says: "What a happy crowd the New Zealand farm women are." That is certainly my impression. She also wonders if city folk envy us. I know many who pity us, mainly, I think, because they know so little of farm life and the friendly spirit that exists in most country districts. I have greatly appreciated the warmth of friendly feeling extended to me by the various country women I have met since I came to the farm as a young and rather shy bride.—**Periwinkle.**

THE other day I came across a new thought on character-reading. The writer said she considered you could judge a woman's character more easily by a list of the things she JOYOUSLY REMEMBERED. That's a rather intriguing idea, isn't it? She went on: "We remember most easily those things that seem to belong to us and to which something within us responds. Not consciously, perhaps, but gradually we shape character by our choices. So give a list of these bright memories and you have a clue to the make-up of a woman's soul." This brings us to our responsibilities in the guiding and training of our children's minds that they may have memories which will influence their personalities towards the fine and good.—**Tiggetty Boo.**

MY garden is a great source of comfort to me. When things seem too bad to be borne I go out and work among my flowers, and when I look upon their beauty and the wonder of their growth somehow everything becomes different.—**Rena.**

I USED to live near the Tararua Ranges and on a frosty morning there was nothing more uplifting than to see the majestic snow-clad peaks sparkling in the sunshine. Now I live miles away from my mountains and have a totally different view to brighten my days. It is of a beautiful bay fringed with pohutukawas in the summer and golden kowhai in the spring, and the sea itself is ever-changing—sometimes a gorgeous blue with the light and shade of the clouds flitting across its surface; or else broken with dark, angry waves in a southerly gale. The view helps tremendously to distract one's thoughts from clay roads in winter, cows floundering in mud or bog and reaching over the garden fence to eat some precious plant — small troubles which seem so important at the time. I thank God that my view is something that has not been spoilt by the war and that the native pigeons and tuis still fly about and the tide ebbs and flows despite man's present strife.—**Pipi Bank.**

WHEN things seem black and not even one spot of silver lining is showing anywhere, then I go out into the paddock and lie flat on my back on the grass and gaze up at the sky. No matter what kind of day it is, whether the sky be cloudless or if "white horses" scurry across overhead, it makes no difference: I always seem to be able to think my way right again. I have never discovered just why, but I do know that after ten minutes of "sky-gazing" I am ready to take a fresh grip on life again.—**Biddi-Jan.**

THE revival of the arts of spinning and dyeing, with the knowledge of Nature acquired through the search for plant dyes; the painting of woodwork articles, parchment work and bookbinding are all useful hobbies and teach patience, accuracy and dexterity. Hobbies tend to make children more sociable, attracting them to those who have similar interests. The young generation need to learn to make proper use of free time and recreational hours and where can they better learn this than during childhood in their own homes. — **"Kaiwhakaora," New Plymouth.**

Impatience has wings and passes the goal, Intention packs her trunk and misses the coach, Resolve starts on foot and wins.—Comtesse Diane.

WHY NOT

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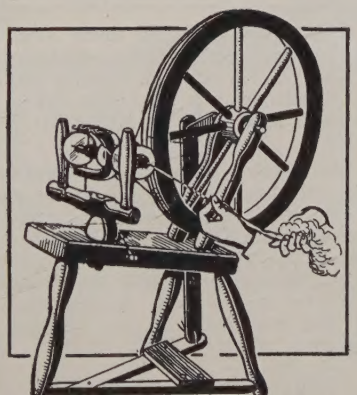

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HOW one's mind goes back to the lovely time of childhood, with its joys and fun and sorrows. My most vivid recollection, overshadowing all else, is of the deep hurt I received the day I carried an armful of golden mimosa for three miles to give my teacher, and she took it from me and threw it into the fire. . . . When later I had children of my own I always encouraged them to bring me their little gifts of flowers or anything they thought mother would like. And now as my boys are reaching manhood I find great joy to have them bring me home from the fields or the hedges some flowers or berries or even a branch of coloured leaves, and they are always put into a vase. I find my daughter doing the same with her children, giving them joy in the sharing of their pleasure with others.—**Roslyn, Dunedin.**

REMOVING STAINS

Chocolate and Cocoa.—Remove these stains by ordinary laundering, or sprinkle the stains with borax and soak them in cold water, then rinse them thoroughly in boiling water.

Coffee.—Fresh stains, and most old ones, on washable materials can be removed by ordinary laundering. A slight trace of the stain sometimes remains in the case of very heavy or old stains, but drying the material in the sun frequently helps to remove the last traces. Boiling water poured on the stain from a height of 2 or 3 feet is effective with stains which are not more than a few hours old.

Fruit and Berries.—The following methods are satisfactory for fruit or berry stains: (1) Boiling water, for white, or fast-coloured, washable materials. Stretch the stained material over a bowl or other vessel, holding it by a string, or an elastic band, if necessary, and pour boiling water on it from a kettle at a height of 3 or 4 feet so that the water strikes the stain with some violence. With some stains, especially those in which fruit pulp was present, a little rubbing, alternated with applications of boiling water, is helpful. A stain remaining after this treatment can frequently be bleached by hanging the wet material in the sun to dry.

2. Warm water, for silk, wool, and other delicate materials. Sponge the stains.

3. Lemon juice and sunlight. Stains remaining after treatment with boiling water can often be bleached by moistening with lemon juice, and exposing to the bright sunlight.

4. Potassium permanganate. Treat the stains first with boiling water.

5. Javelle water.

6. Hydrogen peroxide made slightly alkaline with ammonia. Stains remaining on silk or wool after sponging with warm water can frequently be removed with a little hydrogen peroxide.

7. Potassium binoxalate, sometimes sold as salts of lemon. A 3 per cent. solution made by diluting a saturated solution (which contains about 6 per cent. of the salt at ordinary temperature) with an equal volume of water. Treat the stains with boiling water, and then boil them in the ninoxolate solution.

Cooked-Fruit Stains

The stains of cooked fruit are somewhat different in character from those of the fresh fruit. More sugar is usually present, and the chemical nature of the colouring matters is apparently altered in some way by the process of cooking, rendering these stains much easier to remove than those of fresh fruit. Use boiling water, or sponge with warm water, or use the ordinary laundering method.

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The *Journal* is issued monthly. The subscription within New Zealand, which is payable in advance and includes postage, is 2s. 6d. a year. The overseas subscription is 5s. Subscriptions should be forwarded or paid direct to any office of the Department of Agriculture in the Dominion. Single copies, price 6d., are available from the Department of Agriculture, Box 3004, Wellington.

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A happy life is not built up of tours abroad and pleasant holidays, but of little clumps of violets noticed by the roadside, hidden away almost so that only those can see them who have God's peace and love in their hearts; in one continuous chain of little joys; little whispers from the spiritual world; little gleams of sunshine on our daily work.

—Dr. Edward Wilson.

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HOW FAST CAN ROADS BE BUILT?

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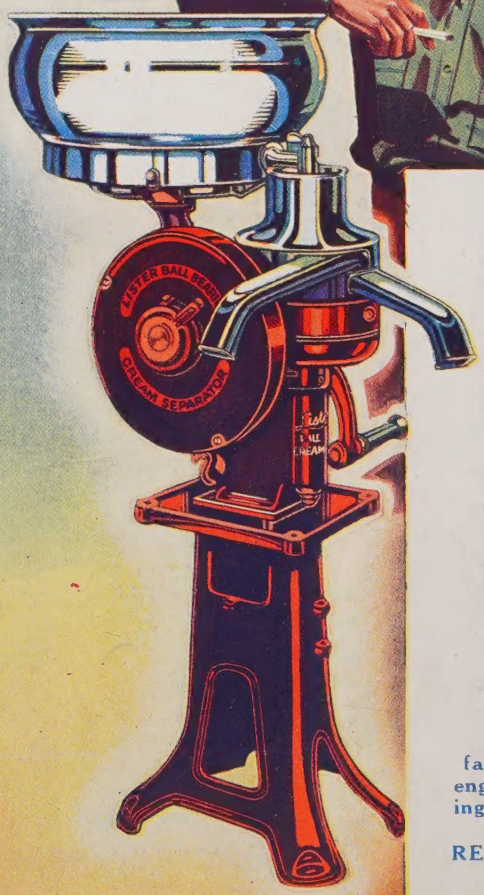

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